TECHNOLOGY DEPARTMENT

Telephone ENGINEER and MANAGEMENT

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JUNE 1947

Featuring

TELEPHONE ENGINEER NEWSLETTER
Page 5

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NEW TOLL SWITCHING PLAN FOR NATIONWIDE TOLL DIALING

•

RURAL SERVICE VIA POWER LINE CARRIER

•

MODERN TESTING INSTRUMENTS
By B. C. Burden

•

Editorial on Page 24

•

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The Cover Picture —

The control room at New York for Bell System overseas radiotelephone service. The technical operators seen are making necessary adjustments to obtain maximum efficiency on radiotelephone channels.

INYO-MONO

California

Inyo-Mono is that portion of California lying east of the 14,000 foot crest of the High Sierras, bounded on the south by the Mojave Desert, and on the north and east by Nevada. The area contains 17,000 square miles of land and is known as having the widest range of scenic and climatic contrasts in America, as it includes both the highest and lowest points on the continent.

Four distinct seasons make Inyo-Mono unique in a state known for its perpetual summer. Tourists and vacationers come here during the year for hunting, fishing, camping, skiing, and general "sight-seeing." The popularity of this part of the country is attested to by the fact that although the year round population is only a little more than 12,000, over 500,000 people come to vacation here annually.

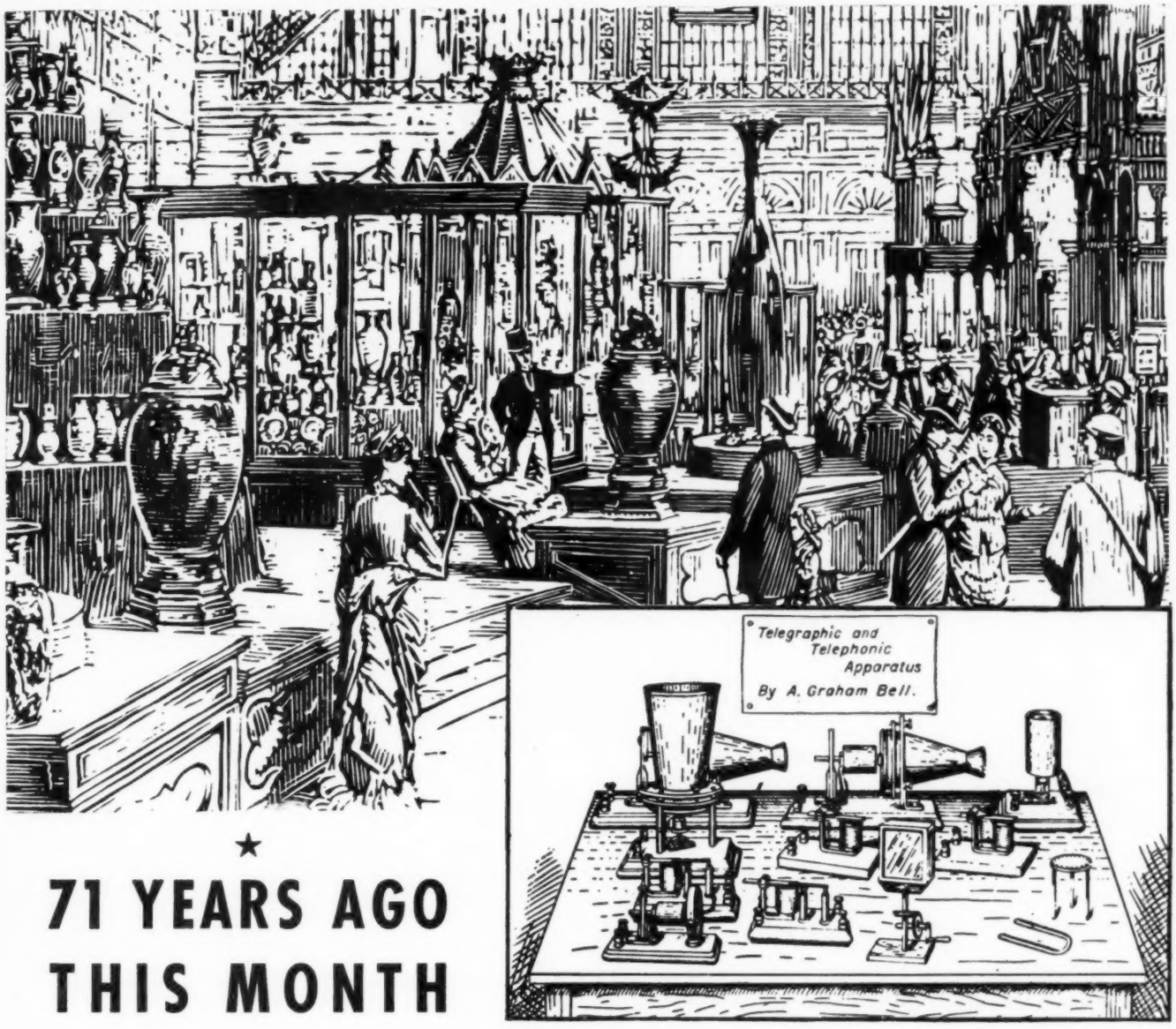
This area is served by the Interstate Telegraph Company which employs the complete directory publishing services of our organization.

It is the desire of the telephone companies to provide their subscribers with accurate and modern telephone directories. We have the responsibility of producing such directories and assisting in the maintenance of satisfactory public relations with the subscribers.

Our employees are trained to accomplish this objective and to substantially increase the advertising revenues from telephone directories. We believe the telephone companies for whom we publish directories in more than 1000 cities and towns will substantiate this statement.

GENERAL TELEPHONE DIRECTORY COMPANY

EASTERN OFFICE: 185 NORTH WABASH AVENUE, CHICAGO 1, ILLINOIS, TELEPHONE STATE 5478
WESTERN OFFICE: PRESS-TELEGRAM BUILDING, LONG BEACH 12, CALIFORNIA, TELEPHONE 672-22



★

71 YEARS AGO THIS MONTH

Bell and his telephone went to the "Fair"

The "Fair" was Philadelphia's Centennial Exposition. Bell's exhibits, placed on a small table, occupied an inconspicuous place on one of the galleries. The public was apathetic and might have overlooked the exhibit were it not for Dom Pedro, Emperor of Brazil, who passed through the gallery on June 25, 1876. He knew Bell, recognized him and spoke. Bell conducted a demonstration, and Dom Pedro, who held the receiver to his ear, shouted with amazement, "It talks!" Sir William Thompson (Lord Kelvin) one of a group of distinguished scientists acting as judges of the exhibits, declared "the telephone was the most wonderful thing he had seen in America."

Perhaps few, if any, of those who had the privilege of witnessing Bell's demonstration, foresaw the vital part the telephone would play in future years. But then, who of us today can foretell the advancements that will be made during the years to come. For telephone progress moves with giant strides, in strict conformance with the telephone tradition of faithfulness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. Since 1895, Exide Batteries have been proving themselves worthy of that trust.

Exide
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

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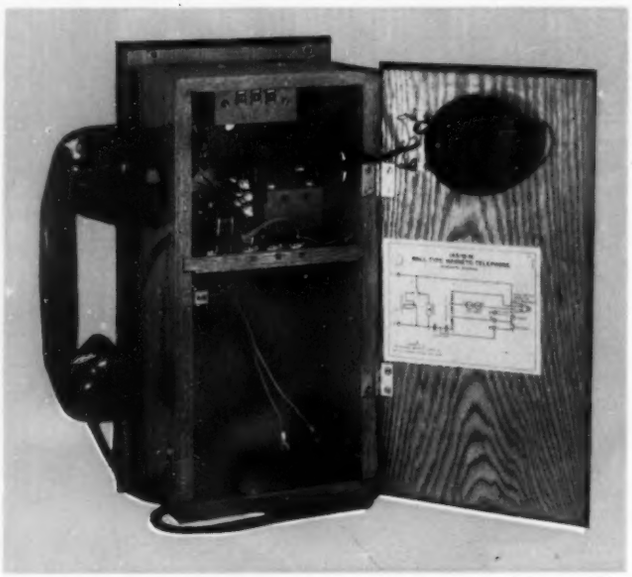

Now AVAILABLE

The *Bantam* MAGNETO WALL TELEPHONE

Endorsed by and now being installed by many of the largest of the independent operating companies in the country.

With these MODERN features—

- Small cabinet: actual wall space required 13" x 15".
- Late style handpiece, sturdily built, with transmitter and receiver that are easily replaceable and interchangeable with modern transmitter and receiver units.
- New styled telephones incorporating latest engineering developments of the United States Army during World War II.
- The electrical circuit is that used by the Signal Corps and is designed to give clear and distinct voice transmission over long distance. This instrument will operate on all moderately loaded grounded (1 wire) or metallic (2 wire) systems. The circuit is so arranged that the bell will ring even when the handset is off the hook.
- The midget generator is equipped with Alnico magnets—the magnet metal that is fifteen times as powerful as ordinary magnet steel. This small but mighty generator is more powerful than many of the largest old style 5-bar generators.
- These phones are for use on telephone lines with 1600 ohm ringers. A ringer for use on 2500 ohm lines will be furnished for small additional cost.
- Wired "silent ring," that is the bell will not ring when calling central or other parties on the same line.
- Replacement parts will at all times be available from a reliable manufacturing firm of 40 years experience in making high grade telephones.

Unconditionally guaranteed to give satisfactory service or all money paid will be refunded.

THE BANTAM TELEPHONE

Order from

DAN'L H. McNULTY,
President & Manager

'Since 1926'

TELEPHONE REPAIR & SUPPLY COMPANY

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NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*
ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH
NEWSLETTERS *on Alternate Weeks*

June 15, 1947

Dear Sir:

Although use of highly technical phraseology such as "separations," "actual use principle," etc., may confuse laymen as to real issue in studies now being made by NARUC, FCC staff and others, gist of proposition is simply: Shouldn't Bell Associate companies receive, for some reason or another, bigger slice of AT&T Long Lines revenues? State commissions hope, we gather, that they should -- so that Commissions can hold down exchange service rates. Some Independents hope that they should -- so they can go after higher commissions on Bell Associate company tolls. But some Independent leaders see danger in latter proposition; too many Independents, they feel, are getting most of their net from tolls now; they'd be safer if they increased exchange rates to a profitable basis instead of depending so heavily on tolls.

* * *

Financial connections between Pacific T&T and AT&T for rate making purposes have been ruled out by California Public Utilities Commission. Commission ruled rates in Calif. must be based on financial condition of Pacific T&T; not on that of parent company. PT&T had asked in its rate increase application that rates be adjusted to show "an equitable proportion of the earnings needed by the entire Bell System."

* * *

On Labor Front: In Illinois, measure designed to delay strikes in public utilities industries pending settlement attempt of Illinois Commerce Commission was defeated . . . Michigan used its public utility strike sabotage law; issued warrants against six men accused of severing telephone cable in Moline . . . Two-States Tel. Co., Texarkana, Ark., signed new agreement with Southwestern Tel. Workers; agreement provides 12-cents per hour wage boost, time & half for Sunday work, 3-weeks vacation for employees with 15 years service, and Armistice Day considered as additional holiday.

* * *

House Small Business committee wants to find out if government is sponsoring consumer cooperative movement as "competitor" to private business. Rep. Walter C. Ploeser (R., Mo.), committee chairman, recently said his group will look into federal loan and tax incentives

for co-ops. Ploeser fears "a dangerous philosophy" has taken hold, that "the ills of capitalism must be cured either by permanent government subsidies or government operation of business which competes with private enterprise."

* * *

American Trucking Ass'n. is testing feasibility of coast-to-coast radio network to dispatch and control truck movements with 11 "guinea pigs" in Chicago. Each truck is linked by two-way radio to association's first urban mobile station.

* * *

Raytheon Manufacturing Co. has formed commercial products division. Frank S. Horning appointed sales manager of new division; William A. Gray named assistant sales manager. Other appointments include: John H. Beedle, production manager of division; David D. Coffin, chief engineer; James N. Nye, engineer in charge of broadcast transmitter equipment; Everett G. Fraim, engineer in charge of speech input equipment, microwave applications, and engineering service and installation supervision on broadcast and microwave equipment.

* * *

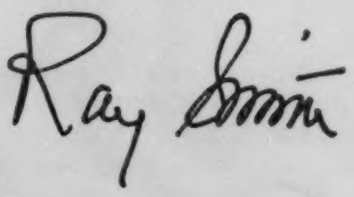
Latest news on excise tax situation indicate excise levies will be increased in most instances under next year's bill to overhaul Federal tax structure. Chairman Knutson of the House Ways & Means Committee said Congress might act this year to reduce or repeal the 25% tax on telegrams and the 20% tax on furs. The Committee completed hearings on excise taxes June 13. It then took up the question of permitting husbands and wives in all states to divide their income for tax purposes. Excise tax increases and community property provisions, along with other major changes in the tax system, would be incorporated in omnibus tax bill to be introduced early in 1948.

* * *

Highlights: Col. Frank W. Matson, member of Minnesota Railroad & Warehouse Commission is pres. of newly formed Midwest Conference of State Utilities Commissioners. Organization made up of representatives of 8 states...Merrill Terry is new manager Farmers Tel. Co., Mound City, Mo...Leeds & Northrup Co., Philadelphia, Pa. dedicated memorial shaft in honor of 15 employees who lost lives in World War II.

Bethlehem Steel Co. plans erection of land station and use of 3 mobile units for its Baltimore manufacturing operations...New officers of Kansas Tel. Ass'n, elected May 17, are: Foster Laning, pres.; Tom Fegan, v.p.; H. B. Couch, sec.-treas...Oklahoma Corp. Commission approved rate increase application of Oklahoma Automatic Tel. Co., Kiowa...Home Tel. Co., Fordyce, Ark. rebuilding exchange: cost approx. $40,000.

Ray W. Smith, Editor



Reliable

PULLING GRIPS
FOR AERIAL AND UNDERGROUND CABLE···

½ inch to 4 inch diameter.

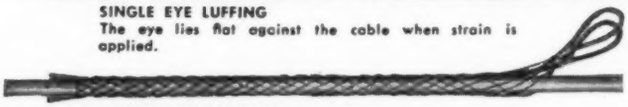
(¾" and 1" Dia. Single Weave)
(1 ½" to 4" Dia. Double Weave)

REINFORCED FLEXIBLE
• For pulling underground cables. Reinforcement protects wires of the grip at shoulder where wear is greatest.
Eye is formed of the wires themselves, and reinforced. There is no joint of the working end of the grip, no loss of strength.
End of each cable strand may be taped to cable insuring ultimate strength of all strands.
(Double Weave)

PLAIN FLEXIBLE
• Single weave grips for pulling aerial cable through rings without displacing them. Also used for small underground cables.
Double weave grips for pulling underground cables where wear does not warrant reinforced grips.

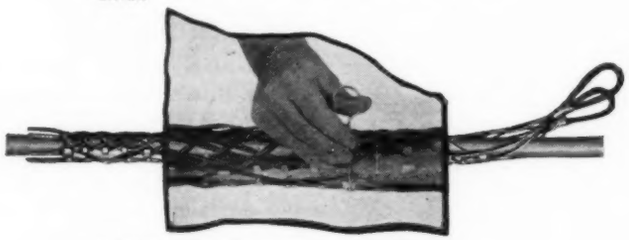
HARD WIRE
• These grips are very tough and stiff, and will withstand great wear. The grip must fit exactly for proper performance. For swabbing ducts. This grip can be packed with waste.
(Double Weave)

SINGLE EYE LUFFING
The eye lies flat against the cable when strain is applied.



DOUBLE EYE LUFFING
Used for pulling out old cable in manhole or for pulling up slack.

SINGLE EYE SPLIT
For moving cables where end is not accessible. An arrangement of strong hooks, make the grip easy to apply, a small tool is furnished, or a small screwdriver.



DOUBLE EYE SPLIT
Application or removal of grip to cable may be done with minimum effort.
¾" Grips — supplied with rawhide lace 1½" to 4" Dia. steel hooks as shown.

MULTIPLE WIRE
• 5/16" to 1⅛" Dia. For pulling any number of wires through conduits.
When ordering, specify diameter of cable or total diameter of wires to be pulled.

Reliable

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CHICAGO 12

40 Years Service to the Utilities

Two IMPORTANT O.K.'s for this BETTER pole treatment

After years of thoroughgoing test, the facts are proving that Chapman "Penta" Preservative is, on all counts, the most satisfactory treatment for your poles which is available today.

Linemen and others who must work on and with poles prefer this clean treating material, because there's nothing sticky or unpleasant about Chapman "Penta" Preservative.

Actual tests by the Forest Service of the U. S. Department of Agriculture show pentachlorphenol superior in decay and termite resistance to any of the 21 other preservatives—including creosote—used in their 10-year-old exposure experiments. That means lower maintenance costs for you.

Chapman "Penta" Preservative treatment costs no more than creosote, and can be obtained in any part of the United States. Write us for details.

CHAPMAN

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The Dow Chemical Company

ON OUR PARTY LINE

•

EEK! GET THE SMELLING SALTS . . .

SPRINGING directly from the desire of telephone companies to bring service as soon as possible to people without telephones, and the practice of installing the telephones in the house and connecting them later, comes this story. In some cases it is possible to arrange for a subscriber to receive incoming calls, though facilities for outgoing service may not yet be available.

One woman whose telephone was so fixed called a friend of hers and fell to wondering, during the conversation, when she would get regular two-way service. This discussion went on for some time and finally the friend on the receiving end asked:

"By the way, where are you calling from now?"

"Why from my own phone," was the answer.

"Well, if you called me, you must be able to make outgoing calls," the friend said.

And the friend is still upset by the dubious reply she got:

"Oh, can you hear me!"

• • •

"TELEPHONE SHOPPERS" . . .

VILLAGE grocers copied the Fuller Brush man to get around the telephone strike.

They sent clerks out to ring doorbells of customers, 90% of whom normally do their business by telephone. An Oak Park, Ill., grocery, for example, kept five clerks taking door-to door orders. Another Midwest grocer mailed his customers mimeographed shopping lists to counter the drop in business which resulted from the stilling by the strike of the manually-operated telephones in small communities. Wives checked off their needs on the lists which were dropped at the store by their husbands. Delivery was then made by trucks as usual.

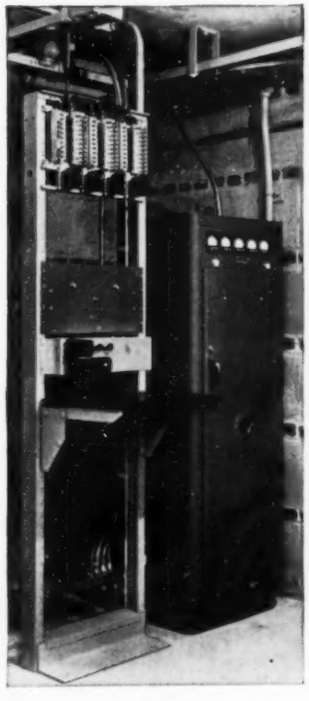
The National Association of Retail Grocers says, however, no stopgap methods can make up for the business lost through the quieting of telephones. It explains: "Women just don't know how to shop any other way."

BELL SYSTEM uses *Motorola* 2-WAY RADIOTELEPHONE to round out its nationwide service

BELL SYSTEM MOBILE TELEPHONE SERVICE

35 LEADING CITIES *with more to come*

The Bell System's mobile telephone service, first introduced at St. Louis in June of 1946, is now providing service in 35 of the Nation's leading cities. Mobile service was introduced in these cities in the following order: St. Louis, Green Bay, Wis., Cincinnati, Detroit, Philadelphia, Newark, Chicago, Washington, Cleveland, San Francisco, Boston, Houston, Pittsburgh, Atlanta, Baltimore, Milwaukee, Columbus, New Orleans, New York, Indianapolis, Miami, Denver, Oklahoma City, Kansas City, Fort Worth, Memphis, Salt Lake City, Ottawa, Ill., Peoria, Ill., Springfield, Ill., Birmingham, Dayton, Los Angeles, Seattle and Toledo. Licenses had also been granted to operated stations in Minneapolis, Louisville, Richmond and Akron, and for a second channel in Boston. New York already had a second channel and several of the other cities which already had service were planning for second and third channels.



In many of the cities which now have mobile service, Motorola mobile transmitting and receiving equipment made by Motorola Inc., is being used. These cities include: Urban—St. Louis, Houston, Chicago, Philadelphia, Cincinnati, Washington, D. C., Cleveland, San Francisco, Detroit, Atlanta, Pittsburgh, Indianapolis, Newark, New Orleans, Milwaukee, Baltimore, Boston, Denver, Columbus, Miami, Fort Worth, Oklahoma City, Kansas City and Dallas; Highway—Chicago—St. Louis, Cincinnati and Green Bay.

FOR INFORMATION ON HOW 2-WAY RADIOTELEPHONE CAN SERVE YOU—*Write Direct to:*

Motorola Inc.

CHICAGO 51 • COMMUNICATIONS AND ELECTRONICS DIVISION

IT SEEMS TO US

The announcement by DANIEL H. McNULTY of Telephone Repair & Supply Co. of the appointment of AL M. WILKINS as Sales Manager for that company brings back to the telephone industry a real personage. Al spent over 21 years with the Cook Electric Company and during the late war years ran a war plant. The call of the telephone industry brought him back and we are glad he is back.

• • •

When this reaches your eye your Editor will be in California to attend their Independent Telephone Association convention. We will then journey up the West Coast to Hood River for the joint Washington-Oregon convention. This will be our first trip to attend these conventions and we hope to meet many of West Coast telephone men personally and we are looking forward to that privilege.

• • •

One of the "travelinest" men we know of is M. W. WERTMAN, of Utilities Service Company, Allentown, Pa. In a hurry to get to points south and west he jumped into his car and drove all the way to Texas before he even started looking for a room to take a bit of rest.

• • •

Talking about fish, which we weren't, but like to, telephone men who get a shiver up their spine when they hang into a nice rainbow trout should get acquainted with BEN' WITTNER of the United Telephone Company at Harrisburg, Pa.

Ben took this corner to Spring Creek near Belfonte the day after the Reading Convention and you ain't seen nothin' yet until you get up to those parts. Ben keeps a record of his fishing scalps and last season his all time trout catch passed the 1000 mark. He caught No. 51 for this year before our eyes . . . and . . . we ate it before his.

• • •

When your editor learned that his brother, ROY, had won a prize at the pre-convention golf tournament in Syracuse, he thought his ears were playing a joke on him. Everything returned to normalcy when he learned why the prize was awarded to Roy. He had lost more balls than any other contestant. His prize, 3 new golf balls.

The National Telephone Magazine

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TELEPHONE ENGINEER and MANAGEMENT

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JUNE, 1947

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Performance in outdoor aging tests shows resistance of neoprene to sunlight—oxidation. *(Issue No. 35, page 181)*

New resilient machine mountings isolate unwanted vibrations. *(Issue No. 19, page 73)*

Hydraulic hose made of neoprene helps make production records. *(Issue No. 37, page 202)*

New gaskets combine properties of asbestos and neoprene for improved heat resistance. *(Issue No. 25, page 108)*

New aerial cable designs improve electrical service. *(Issue No. 36, page 192)*

Roll replacement costs cut by new patching material. *(Issue No. 37, page 198)*

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make for TOUGH DIGGING . . .

. . . But the Highway Model HD Earth Boring Machine takes them all in stride. Holes from 6″ to 20″ diameter, from 7′ to 10′ deep, straight down or at an angle, can be completed in less than two minutes! But that's only half the story:

This same machine, equipped with integral winch and derrick, sets poles 40′ to 45′ long, weighing 2000 to 2500 pounds. That means doing away with the expense of an extra line truck and extra crew to set the poles!

Leading engineers and maintenance superintendents go all-out in their praise of Highway equipment. That's because this equipment is designed by men who are thoroughly familiar with the job to be done. Highway Line Construction and Maintenance Bodies, Highway Pole and Cable Reel Trailers, Highway Winches and Power Take-offs deserve your investigation. Write today!

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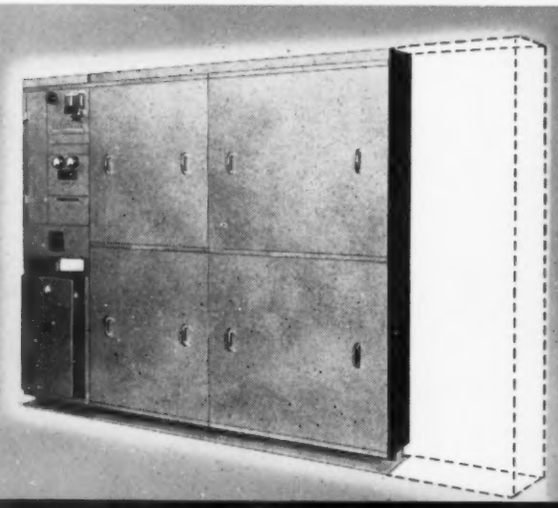
General Offices: **EDGERTON, WISCONSIN, U.S.A.**

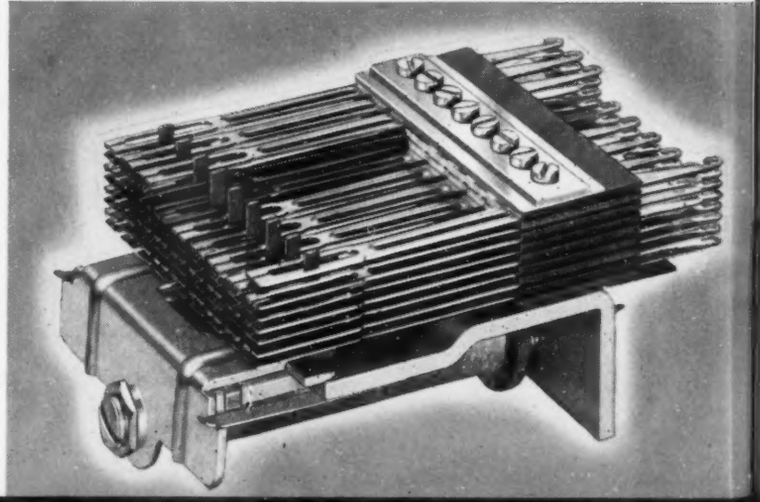
SEE THIS LINK ASSEMBLY...

Inset shows a typical link assembly as it comes to you when you are ready for expansion. Easy to install, additional lines or links come in factory-wired and tested units, ready to mount and wire into the board.



• SAVE SPACE—SAVE DOLLARS

The dotted line portion of this photograph shows just how much space is saved with the new, simplified Relaymatic. New construction is costly today, but the compact Relaymatic requires 49 per cent less space (for the 100-line board) than was necessary for former models—yet it's the most efficient Relaymatic ever built.



• HERE'S THE SECRET OF RELAYMATIC COMPACTNESS

Shown is a typical multiple contact relay. New armature design, together with a new mounting arrangement, make possible the substantial savings in floor space. To assure operating dependability, all relays have twin contacts of precious metal on nickel-silver springs. Each piece of Kellogg equipment represents the best available in material, design and workmanship.

.. IT LOWERS EXPANSION COSTS

through simplified wiring in the KELLOGG RELAYMATIC

Combines the finest in relay engineering with many profit-making, cost-saving features . . .

Adding new lines or links to the Kellogg Relaymatic is greatly simplified through new wiring arrangements which make expansion possible with both speed and efficiency. The link assemblies, factory wired, tested and ready for mounting, may be quickly installed. There's no costly interruption of service—and you save valuable time and money.

In addition, you will find the new Relaymatic far more compact. Space-saving relays and the new mounting arrangement make possible a board that requires only 49 per cent (for the 100 line board) of the space formerly needed. Such compactness means additional dollars saved for you in the construction of buildings for telephone equipment.

The new relay (the "heart" of the Relaymatic) provides increased dialing range, perfect noise-free connections and improved transmission—all plus values that mean better service at lower cost.

And with all this, there is as ever the Kellogg reputation for quality, for trouble free performance. Plan today for tomorrow's operations—with Kellogg. Ask your Kellogg representative now for more information on the Relaymatic, or write us today.

KELLOGG SWITCHBOARD & SUPPLY CO.

6650 SOUTH CICERO AVENUE, CHICAGO 38, ILLINOIS

• BACKED BY 50 YEARS OF RELAY ENGINEERING

Large photo shows a portion of the Kellogg engineering offices, inset shows part of the engineering staff. Behind the relays used in the new Relaymatic are 50 years of relay designing, engineering and manufacturing experience. Relays are the key to efficient dial switchboards. They must be right—and Kellogg relays have been right for half a century.

- Relaymatics provide for all the necessary features for inter-toll dialing that are now considered national standards.
- Available in Broadspan and Selector types for either unattended Community Dial Exchanges or larger attended Main Dial Exchanges.
- Relay operation throughout.
- Progressive allotment of idle connecting circuits.
- Lines in trouble automatically cut out.
- Revertive calls by directory numbers.
- Time limit on connections.
- Revertive calls do not tie up connecting circuits.

The factory of Kellogg Switchboard & Supply Co., will be closed for vacation from Thursday, July 3rd through Sunday, July 20th.

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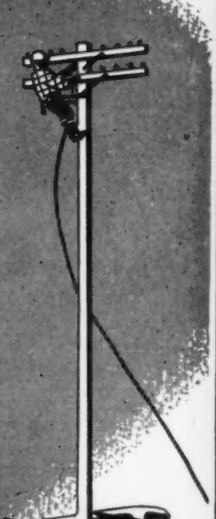
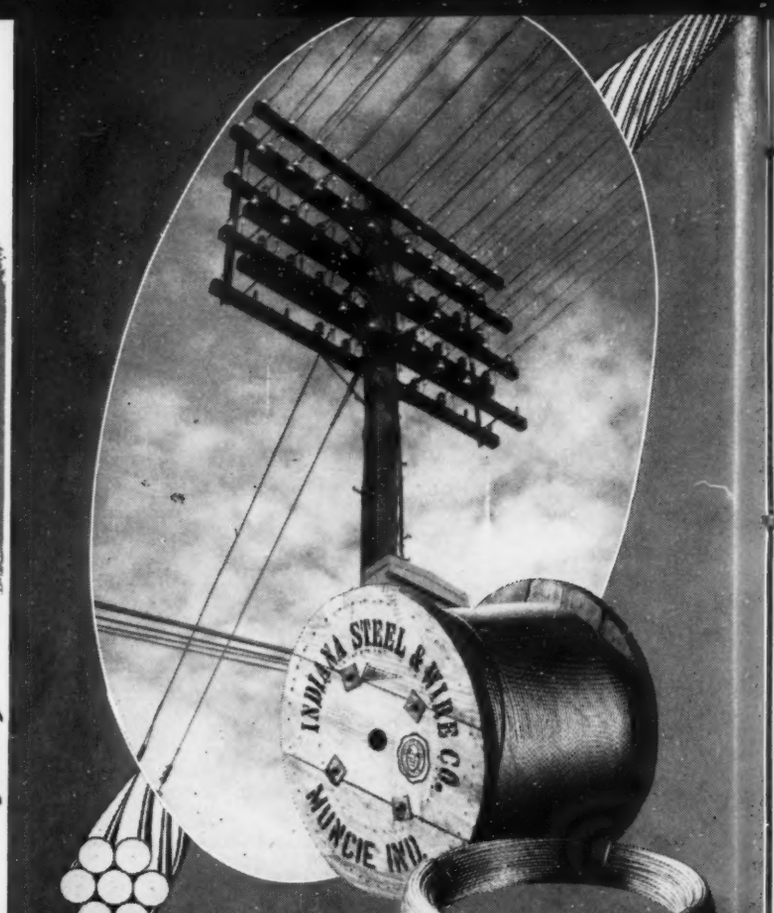
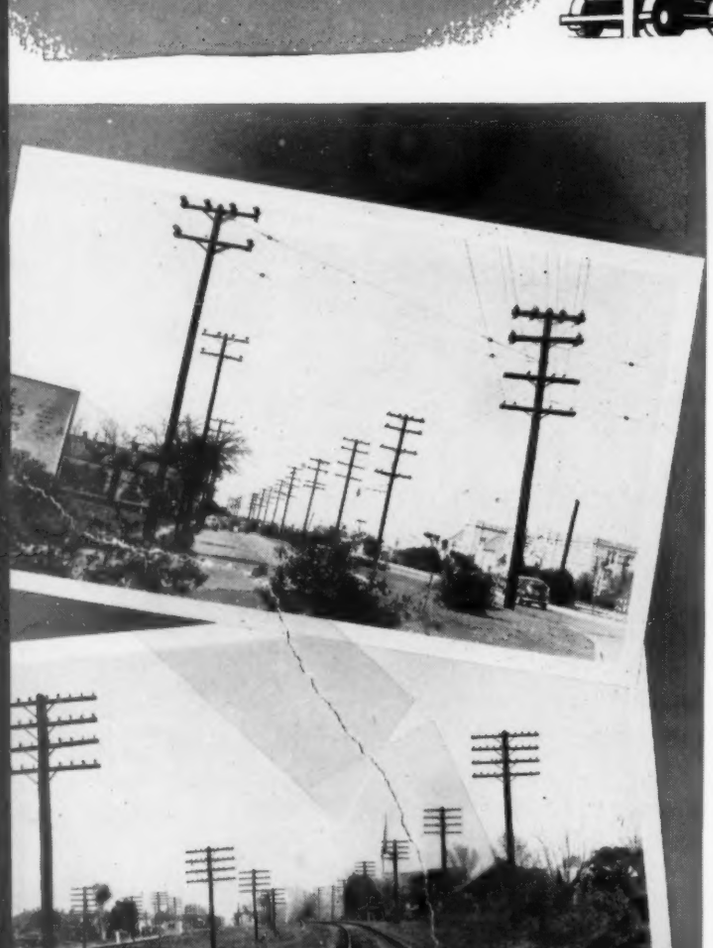
Recommended and Guaranteed by KELLOGG

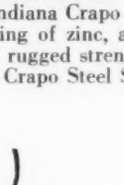




The Time-Tested Strand. Lasting protection against corrosion is provided in Indiana Crapo Steel Strand, thanks to its heavy, ductile, tightly-adherent coating of zinc, applied by the famous Crapo Galvanizing Process. This, plus rugged strength, are your assurance of long life and low maintenance. Use Crapo Steel Strand, made by INDIANA STEEL & WIRE COMPANY.

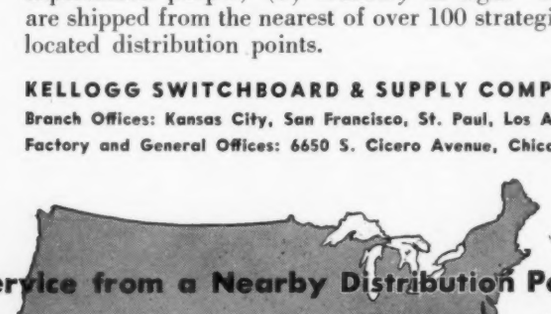


Long Life Expectancy is built into pressure-treated Southern Pine Poles and Crossarms. Carefully and thoroughly treated by the AMERICAN CREOSOTE WORKS, INC., these poles have the extra durability required for dependable service under the toughest climatic conditions. For longer lasting, stronger poles, use "Pressure-Treated Southern Pine."



There's three-way satisfaction when you concentrate purchases of line supply and constuction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 100 strategically located distribution points.

KELLOGG SWITCHBOARD & SUPPLY COMPANY
Branch Offices: Kansas City, San Francisco, St. Paul, Los Angeles
Factory and General Offices: 6650 S. Cicero Avenue, Chicago 38

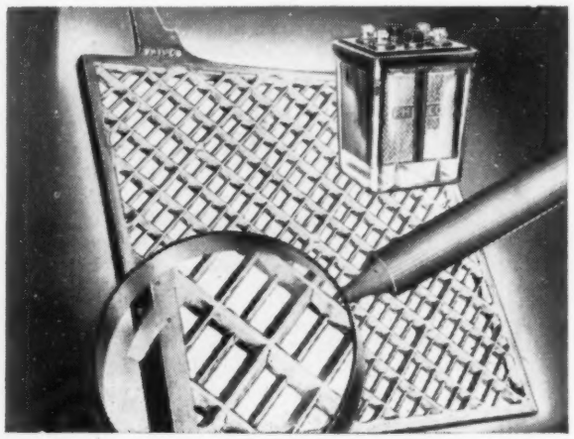


For Service from a Nearby Distribution Point

Order Your Line Supplies from

KELLOGG

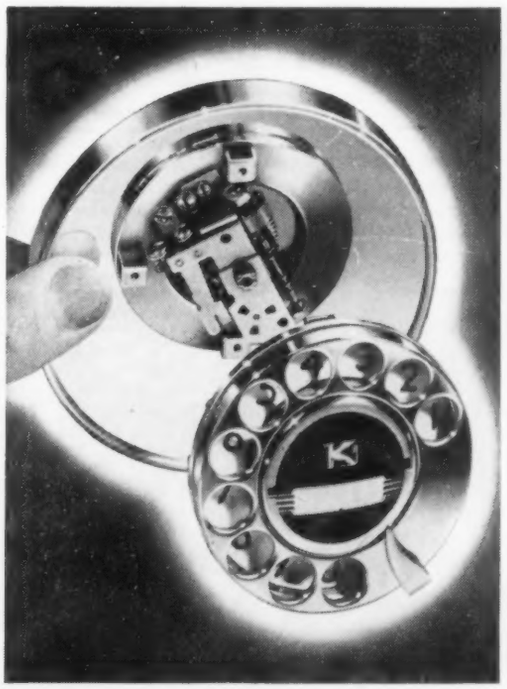
You Can Reduce Replacements when you use "Eveready," "Columbia," "Gray Label" Telephone Cells. Products of the world's largest dry battery laboratory at NATIONAL CARBON CO., INC., they are famous for sustained voltage, extra hours of service life, and uniform high quality.



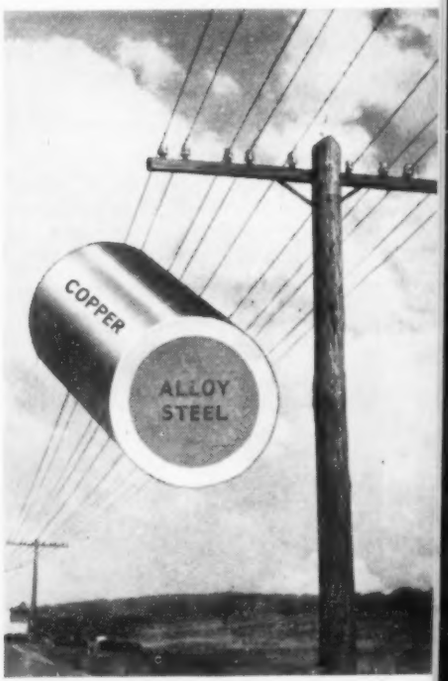
For Full Float Service. Every PHILCO Telephone Battery has the famous Floté grid developed specifically for full float service. The design and metal in Philco Floté grids represent a marked advance resulting in greater electrical efficiency, the elimination of low cells and longer life.

Moisture-proof, Compact, Convenient. The Cook Type "T" Main Distributing Frame permits direct termination of paper-wrapped cable, and eliminates time-consuming splicing and expensive silk and cotton covered cable. It has a metal fanning strip with insulating bushings in fanning holes and a white designation strip for quick easy numbering of pairs. Made by COOK ELECTRIC COMPANY.

Dependable — In Any Weather! Hemingray Insulators are made to withstand severest weather. They defy rain, snow and sleet. Products of OWENS-ILLINOIS GLASS CO., many of these insulators are still serving after 20, 30 and even 50 years. Shown is Hemingray No. 9.



Everything You Want In a Dial, you get in the new Kellogg Master Dial. No dial is so easy to install or maintain; so quiet in operation; so impressively beautiful; so dependably accurate. Performance—proved—passed tests far beyond normal requirements. Another outstanding KELLOGG product.



For Long-Life, Long-Span Lines, use Copperweld Wire. It's light in weight, small in diameter . . . very easy to string. A thick, protective covering of copper *permanently* molten welded to an alloy steel core prevents rust. Made by COPPERWELD STEEL CO.

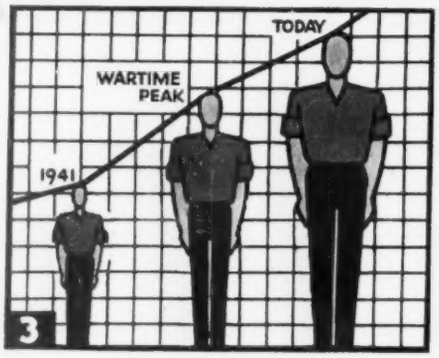
News for YOU about Telephones

. . . from Western Electric — supply unit of the Bell System

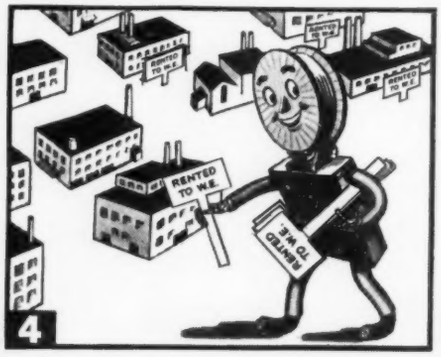
WESTERN ELECTRIC SUPPLIED 30% OF WAR COMMUNICATIONS EQUIPMENT ..
50% OF ALL RADAR PRODUCED IN U.S.A. FOR WAR
FROM PRESIDENTIAL CITATION
1

THROUGHOUT WAR Western Electric poured out military communications equipment and radar—could make little civilian telephone equipment. V-J Day found plans set to get back *fast* to Bell System job.

HUGE JOB AHEAD! At war's end, 2,200,000 people waiting for telephones—central offices and circuits loaded by record use of telephone. Here's how Western Electric converted to biggest peacetime job.

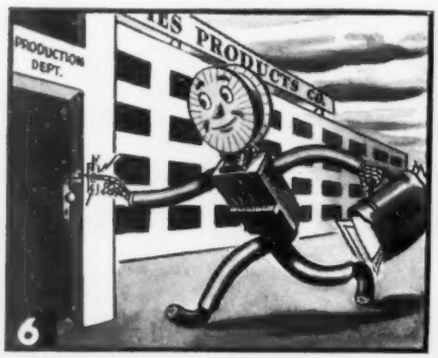


ARMY OF PEOPLE HIRED as the telephone job got rolling. Thousands of others were trained for new work. Over 120,000 on the job today—far above *wartime peak* of 97,416 —*nearly double* 1941 total of 63,720.

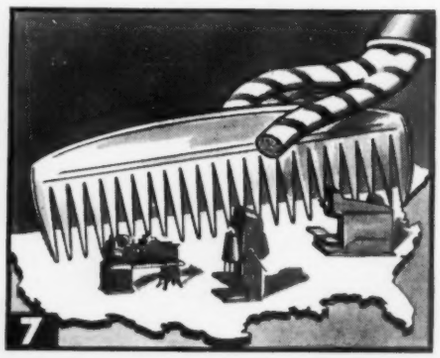


26 FACTORIES RENTED to get space *quickly*. 19 plants originally rented for war were kept, 7 more leased. Total production space now owned and rented is more than 14,000,000 square feet—or 341 acres.

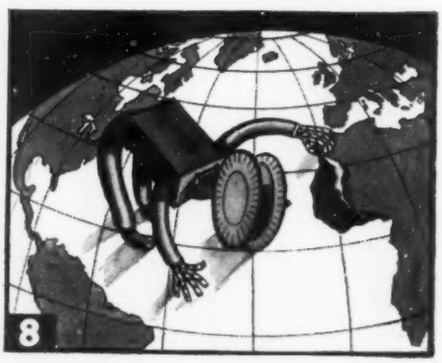
PRODUCTION LINES MOVED without disrupting work! To boost output *fast*, many operations moved to new quarters. One telephone shop closed Saturday—re-opened Monday miles away with 3000 people at work.



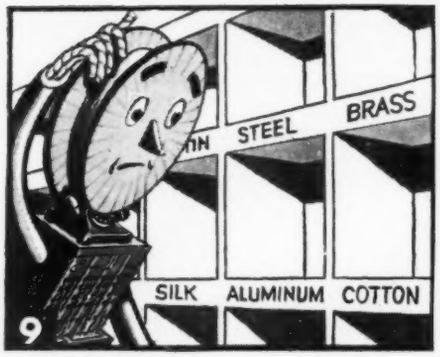
SUB-CONTRACTORS WERE CALLED ON TO HELP. More than 800 made urgently needed tools, parts, component equipment and cable. War surplus telephone materials also were purchased to help meet enormous needs.



THE WHOLE COUNTRY WAS COMBED for hard-to-get tools and machinery to put the manufacturing program into high gear. The success of this search helped make possible production breaking all records.



THE WORLD WAS SEARCHED to overcome shortages of many critical materials needed in great quantities for making telephones, switchboards, cable, to speed Bell Telephone System's huge expansion program.



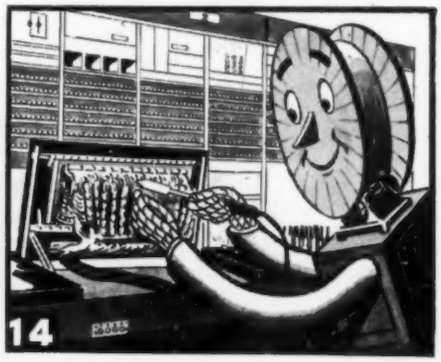
SUBSTITUTES GALORE were found for unobtainable materials. In one shop using 1340 different items of raw material, 950 substitutions were made in 9 months—as many as 4 for one item. Production mounted fast!

ENDLESS SLEUTHING FOUND SUPPLIES for Bell System. 1946 purchases, including raw materials, from 15,000 suppliers, ranged from pencils to telephone poles, precious metals to wood pulp, exceeded $250,000,000.

WORKING 'ROUND THE CLOCK got the most out of plant. In 1946 Western Electric delivered to the Bell Telephone Companies more apparatus, equipment and supplies than in any other year in its 77-year history.

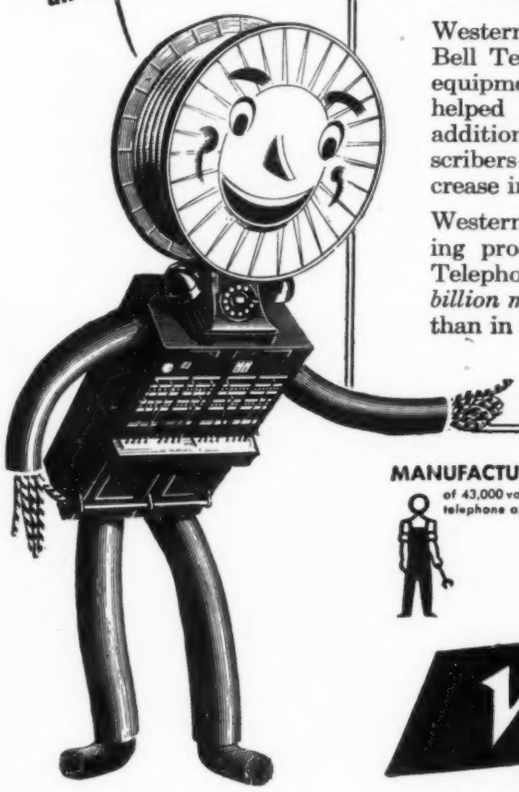
FROM COAST TO COAST, Western Electric's distributing force rushed to deliver equipment and supplies to the Bell System. Each of 29 distributing houses, across the nation, stocks some 10,000 different items.

REPAIRING WORN TELEPHONE EQUIPMENT has long been another job of the 29 distributing houses. The speed with which they put equipment back on its feet helped in meeting record telephone demands—*faster!*



INSTALLING CENTRAL OFFICE SWITCHBOARDS and equipment in some 1200 localities monthly kept Western Electric's installation crews busy in '46. Thousands trained in this specialized work. Force is now 25,000.

"Here's what it all adds up to"



Results in '46

Western Electric furnished the Bell Telephone Companies with equipment and supplies which helped them provide 3,264,000 additional telephones to subscribers—more than twice the increase in any previous year.

Western Electric's record-breaking production helped the Bell Telephone Companies handle *7 billion more* telephone calls in '46 than in any previous year.

Outlook for '47

Western Electric schedules call for far greater production in '47—for such enormous amounts of equipment as:

Dial exchange equipment to handle, when installed, 2,222,000 additional lines;

8410 manual switchboard positions;

Nearly 4,000,000 telephones;

Telephone cable of all types containing over 49 billion feet of wire.

This tremendous output in '47 will go a long way to help the Bell Telephone Companies meet the nation's unprecedented demands for telephone service.

MANUFACTURER... of 43,000 varieties of telephone apparatus.

PURCHASER... of supplies of all kinds for telephone companies.

DISTRIBUTOR... of telephone apparatus and supplies.

INSTALLER... of telephone central office equipment.

Western Electric

A UNIT OF THE BELL SYSTEM SINCE 1882

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LaMar S. Stoops, *Manager*
Nappanee Telephone Co.,
Nappanee, Ind.

▲

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DROP WIRE

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Manufactured to exacting specifications, utilizing advanced techniques and modern equipment under positive laboratory control.

Distributed by
KELLOGG SWITCHBOARD AND SUPPLY CO.

GENERAL INSULATED WIRE WORKS, INC.
PROVIDENCE, RHODE ISLAND

☆ *Advances in the Industry*

New Telephone Ideas

BY MYRLE SHAFER

Weather Maps

Arrangements have recently been made between the Army Air Force and the A. T. & T. Long Lines for 15,000 airline miles of telephone network which will extend between army air fields in all parts of the United States. The network will be used largely for sending weather maps from a main control point at Arlington, Virginia.

Lightning Calculator

Engineers responsible for lighting in the larger exchanges will be interested in a new **rapid lighting calculator** for use in engineering illumination. It is a slide rule type calculator useful in determining the amount of illumination required for various size rooms.

Miniature Capacitors

The design trend in electronic equipment seems to be toward smaller and smaller components. The proximity fuse which in conjunction with aerial shells stopped the Germans cold during the latter stages of the war was responsible for the development of **tiny vacuum tubes** about half the size of a cigarette. Pocket radios and new compact hearing aids have resulted from the development of **miniature batteries** weighing only a few ounces yet having potentials of 30 volts and higher. (These batteries are already being used in new compact types of telephone equipment.) **Printed circuits** have reduced wiring as well as resistors in vacuum tube circuits to unbelievably small demensions.

Latest in this trend toward Lilliputian components are the new ceramic **miniature type capacitors.** These capacitors, which are only a fraction of the size of regular units, obtain their high capacitance by the use of a ceramic disc having an unusually high dielectric constant. These miniature capacitors can be made in sizes ranging from a few micro-microfarads to one microfarad. A 0.01 m.f. capacitor is only one half inch in diameter and very thin.

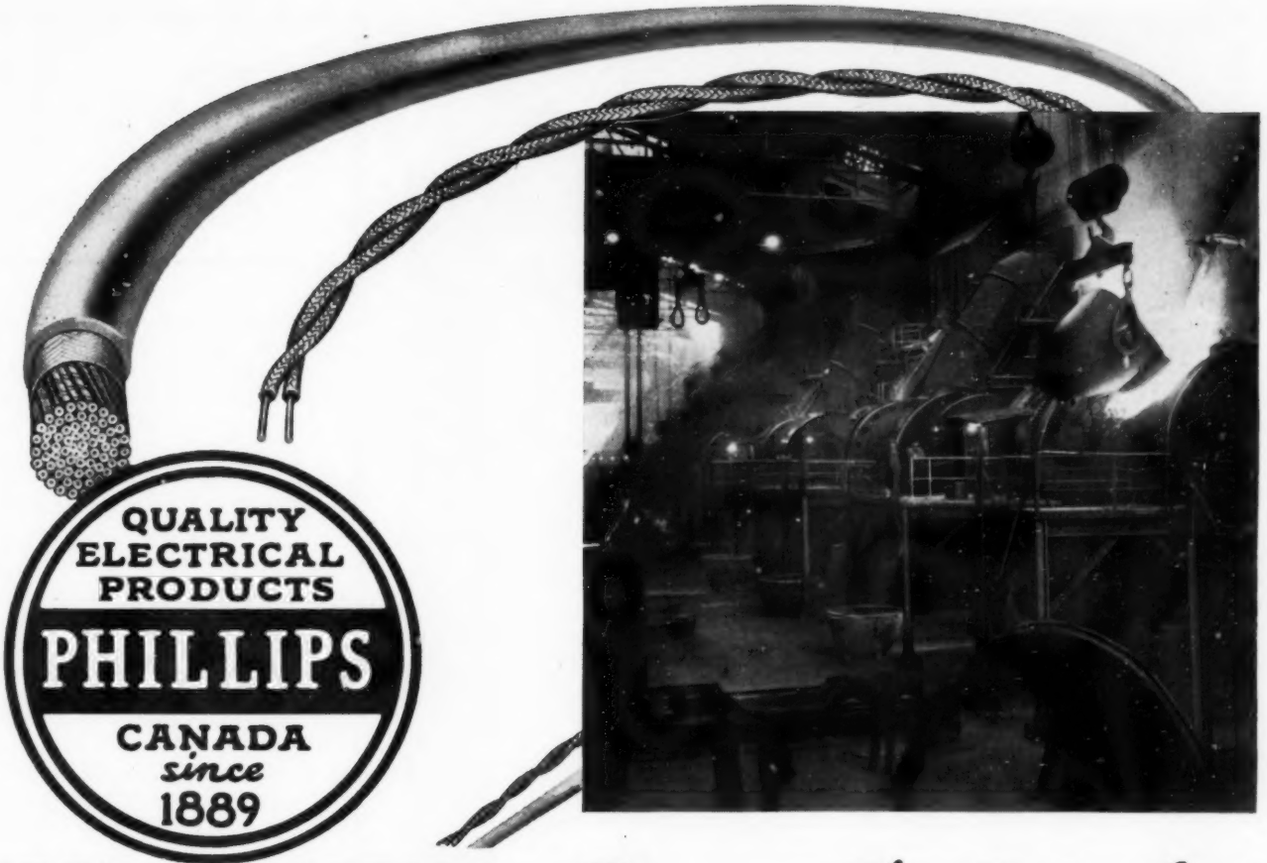
Amplifies 10,000 Calls

The "traveling-wave" tube, an entirely new vacuum tube amplifier which may be of far-reaching significance in long distance telephone and television transmission, is in a stage of development.

The new tube promises to amplify voice or television signals over a frequency band 40 times as

wide as that of the best tube now in use and to give many times the amplification, or it might theoretically handle more than 10,000 simultaneous cross-country telephone calls.

The device acts on electric waves like a breeze blowing ripples in a pond, the ripples growing larger and larger as the breeze blows them along. The new tube is about 18 inches long and simple in design. It contains an electron gun which fires a stream of electrons through a coil in the tube.



QUALITY ELECTRICAL PRODUCTS

PHILLIPS

CANADA *since* 1889

WIRES and CABLES *Serve The World!*

Phillips products distributed through the globe-girdling organization of the International AUTOMATIC ELECTRIC Group, have earned a world-wide reputation for quality.

Wherever they serve, Phillips products meet all requirements of public service companies. Behind every reel of cable, every roll of wire, is sound engineering—and half a century of manufacturing experience in meeting the demands of the communication and electrical industries. Throughout the huge and modern Phillips plants, production standards are high, because YOUR standards are high!

For their outside plant construction, telephone companies and operating administrations, all over the world, look to International AUTOMATIC ELECTRIC Corporation for Phillips quality wires and cables. We shall be glad to serve you, too.

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and other manufacturers
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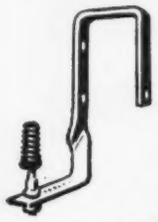
GraybaR
TELEPHONE SUPPLIES
BULLETIN

POLE-LINE HARDWARE



For your pole lines, you want hardware that will help assure uninterrupted service over the years — and you want to obtain the right items the easiest way. Graybar can meet both your wants. We distribute Hubbard hardware—skilfully designed and carefully made for long, trouble-free telephone service. Our near-by warehouse is a convenient source of this dependable hardware.

...AND INSULATORS

Via Graybar, you can get the highest quality of glass or porcelain insulators, porcelain spools, knobs, tubes, and guy-strain insulators. To avoid delays due to supply shortages, outline your plans to our local representative now; he'll schedule deliveries to fit in with them. And remember — your Graybar Outside Construction Specialist is qualified — and anxious — to help you solve any pole-line problem. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.* 4765

EVERYTHING IN TELEPHONE SUPPLIES via GraybaR

IN OVER 90 PRINCIPAL CITIES

IT'S GOT TO BE GOOD TO GO "VIA GRAYBAR"

Hundreds of different telephone supplies and equipment are distributed by Graybar. In many classifications, we handle two or more competing makes. But Graybar selects for distribution *only* items which are made by reputable manufacturers and which have thoroughly proved themselves in actual service. Be confident that any item you get "via Graybar" will do its job well.

Do You K

BY RICHARD ALLEN

To determine whether telephone companies can provide railroads with a service comparable to urban and highway mobile communications, the Federal Communications Commission has given Illinois Bell the first construction permit of its kind to set up a radiotelephone land station and install 32 mobile units for the Atchison, Topeka & Santa Fe railroad.

★

The Pennsylvania Bell is first telephone company to receive a grant from the Federal Communications Commission to own, install and maintain the equipment for an industrial radio system. King Farms of Morrisville, Pa., for which the service will be provided, will operate a land station and 11 mobile units to expedite planting, cultivating, harvesting and marketing on its 6,000-acre truck farm.

★

In the beginning of the telephone industry, linemen could not get life insurance at all; later they got small policies at high rates. It was not until 1911 that a lineman was insurable for ordinary premiums.

★

Over seven billion more calls were handled in 1946 by the Bell System than in 1945. This was more than the total increasing for the preceding five years.

★

A power company reports that damage by woodpeckers makes necessary the replacement of at least 100 of its poles each year.

★

A single big dial telephone exchange requires 4,000 miles of wire in pieces of varying lengths and as many as 2,500,000 solder connections before it is ready to use.

★

Under one street corner in New York City are 282 telephone cables containing 560,000 wires.

ou Know ?

ILLUSTRATED BY PAULSON

Prodigal use of the nation's raw materials during four years of war has focused serious attention on declining national reserves of lead, copper, iron, zinc and many other resources vital to industry. Although our country has been drawing extensively from its natural resources for less than 100 years, there are signs of ultimate depletion within the foreseeable future.

★

In 1923 France was cursed with more varieties of telephone instruments than any nation under the sun. It was estimated that 150 varieties were manufactured and sold. Reason: subscriber required to buy the instrument outright; government operated the lines.

★

For every $100 a stockholder invested in one telephone company 25 years ago, he has received an average of only $5.49 a year. He would have earned much more by letting any one of many other industries use his money.

★

The pay check and the dividend check are symbols of a sound and successful business. Only when both groups receive fair and reasonable compensation for the part they play, can the business continue to grow and provide service satisfactory to the public.

Kleins for safety's sake

Linemen are Kleinmen because they know that their very safety depends on the quality of the equipment they use. Klein has been their standard "since 1857."

***KLEIN CLIMBERS** assure safe trips up and down the pole. They do not cut out.*

***"KLEIN-KORD" RED CENTER SAFETY STRAPS** provide maximum safety—the Red Center unmistakably signals when the strap should be replaced.*

***"KLEIN-KORD" TOOL BELTS** give the safety, comfort and convenience needed for fast, efficient work.*

***KLEIN PLIERS** with their proper balance, sharp knives and matched jaws help in doing any wiring job better, quicker.*

Be sure to equip your linemen with Klein Pliers and equipment. Your supplier will fill your order as rapidly as possible.

Ask Your Supplier

Foreign Distributor: **International Standard Electric Corp., New York**

The Klein Pocket Tool Guide showing the Klein line and containing useful tool information will be sent on request.

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Mathias KLEIN & Sons

Established 1857 — **Chicago, Ill., U.S.A.**

1200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

EDITORIAL

A New Telephone Era

TWICE within the adult memory of most of the present managers of telephone companies, there have been serious interruptions in the normal growth of telephones in this country. One was during the several years of what many now call the Great Depression — a period most seriously affecting the telephone industry from 1931 until 1937. The other time was the war period recently ended.

Both times the telephone industry has shown its remarkable vitality by the scope of its recovery and the resumption of its onward march.

As to the depression: In 1930, just before the telephone industry began to really feel the effects of the country-wide slump, there were about 20,200,000 telephones in service in the United States. By 1933 the number of telephones had dropped to around 16,700,000. But by 1939 they had risen again to some 20,800,000, more than wiping out all the depression loss.

During the recent war period telephones in service continued to grow, but the growth was at a slower pace than it would have been if conditions had been those of peace time. This was because, of course, materials and manpower were not available for the normal growth of civilian service during the war.

Since the end of the war the growth of telephones has been so rapid and so large that the results are staggering. The number of held orders for telephones — applications the telephone companies have been able to take care of to date—is still large. New applications keep rolling in. There will soon be at least 30,000,000 telephones in the United States.

The plain fact is that the number of telephones that will be demanded by the public of this country in the years to come is practically a "ceiling unlimited" proposition. There may be setbacks from time to time, due to recessions or other economic causes, during which the rate of growth will be temporarily slowed down. There could even be a temporary decrease in the number of telephones in service, if the recession was sufficiently severe. But the main point is that all these setbacks are temporary. Over the years the number of telephones will go on increasing. We are a very long distance from any saturation of telephone service in this country — it may never come.

We recite all of this in order to state our belief that managements of Independent telephone companies must be prepared for growth, and lots of it, over the long pull. They must be prepared to finance, expand; to fit their properties to meet the new era of the telephone industry.

In addition, they must take cognizance of all the new things that are being and that can be intergrated into the telephone industry — such as mobile telephone service, carrier current, radio, voice recorders and so on. The industry can neither escape nor stop the introduction of these new things into the telephone business, even if it wanted to do so — which, of course, it does not.

The principal problem about these new things is not to stop them, but to see that their intergration into the telephone business is on a sound basis.

Telephone managements have a sizeable job ahead of them. A new telephone era is upon us. It may create some profound changes in the telephone industry. Independent telephone managements must face it squarely and meet the requirements of it as rapidly as they arise. If they do that — and there is no reason to think that they will not — the Independent telephone industry will be bigger and better than ever before.

This Emblem

INTERNATIONAL

Identifies Great Trucks

BACK OF THE TRUCK—THESE 3

International TRUCK SERVICE • International ENGINEERED PARTS • International APPROVED ACCESSORIES

Rugged stamina! Long mileage! Economy of operation!

International Trucks provide all three in such abundance that for 16 years more heavy-duty International Trucks have served American commerce and industry than any other make.

And to make sure that every operator gets every profitable mile and every available economy from every International Truck, this is the *Three-Part Service* International provides:

MAINTENANCE AND SERVICE

Quickly available everywhere from thousands of International Dealers and the nation's largest company-owned truck-service organization—International Branches.

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Precision-made, like the originals in International Trucks—wear better and last longer.

APPROVED TRUCK ACCESSORIES

A complete line for every truck need. Triple-checked against the most rigid standards to assure efficient, trouble-free performance.

Yes, International *Three-Part Service* makes sure that operators get the extra mileage, the dependable stamina and the low operating cost built into all International Trucks.

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INTERNATIONAL HARVESTER COMPANY
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40TH ANNIVERSARY OF INTERNATIONAL TRUCKS

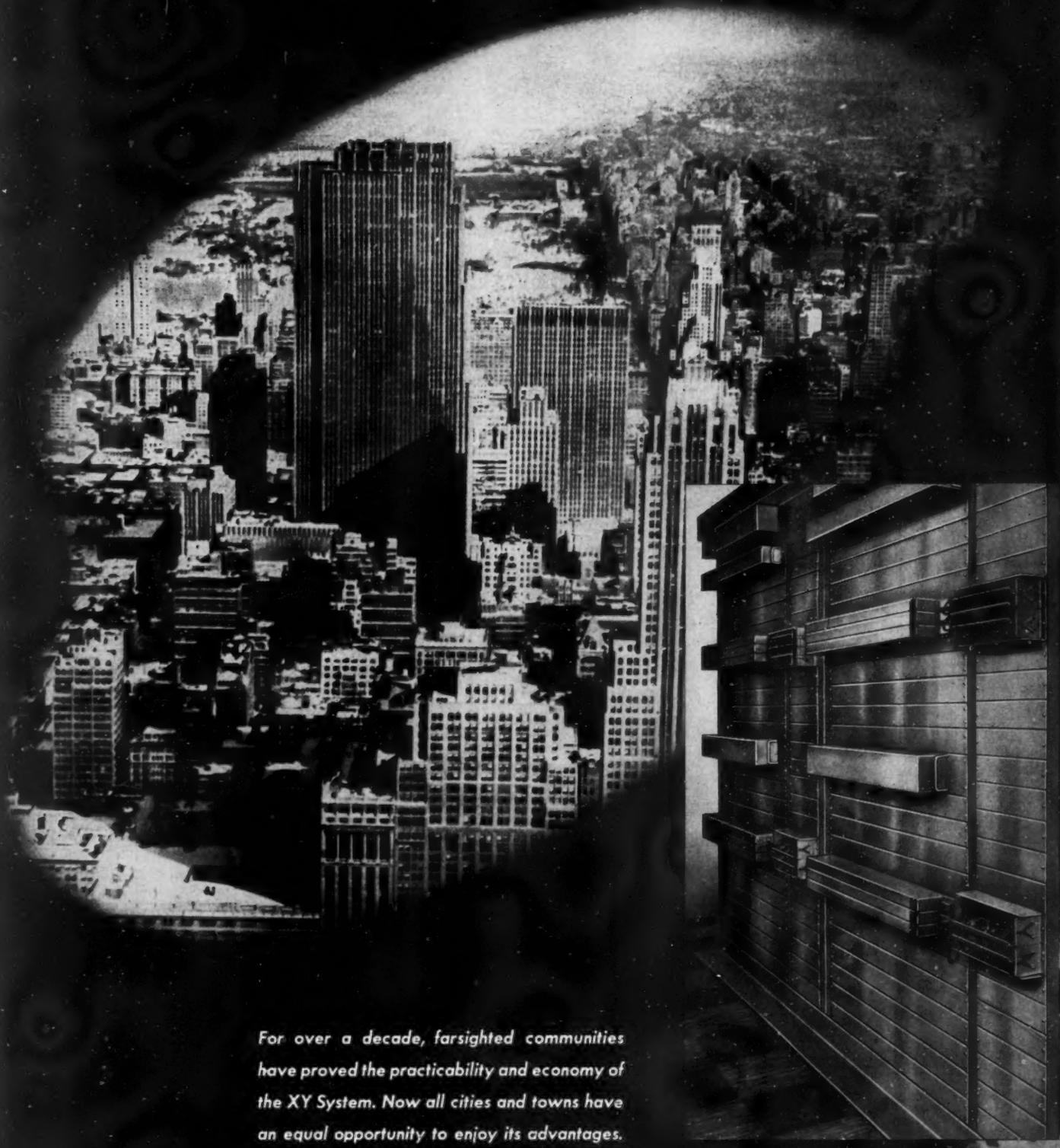
1907-1947—Forty years of International Truck Service to Industry, Commerce, Agriculture

INTERNATIONAL

Tune in James Melton on "Harvest of Stars" Sunday I NBC Network

INTERNATIONAL Trucks

for today's and tomorrow's needs of



For over a decade, farsighted communities have proved the practicability and economy of the XY System. Now all cities and towns have an equal opportunity to enjoy its advantages.

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ds of any size community . . .

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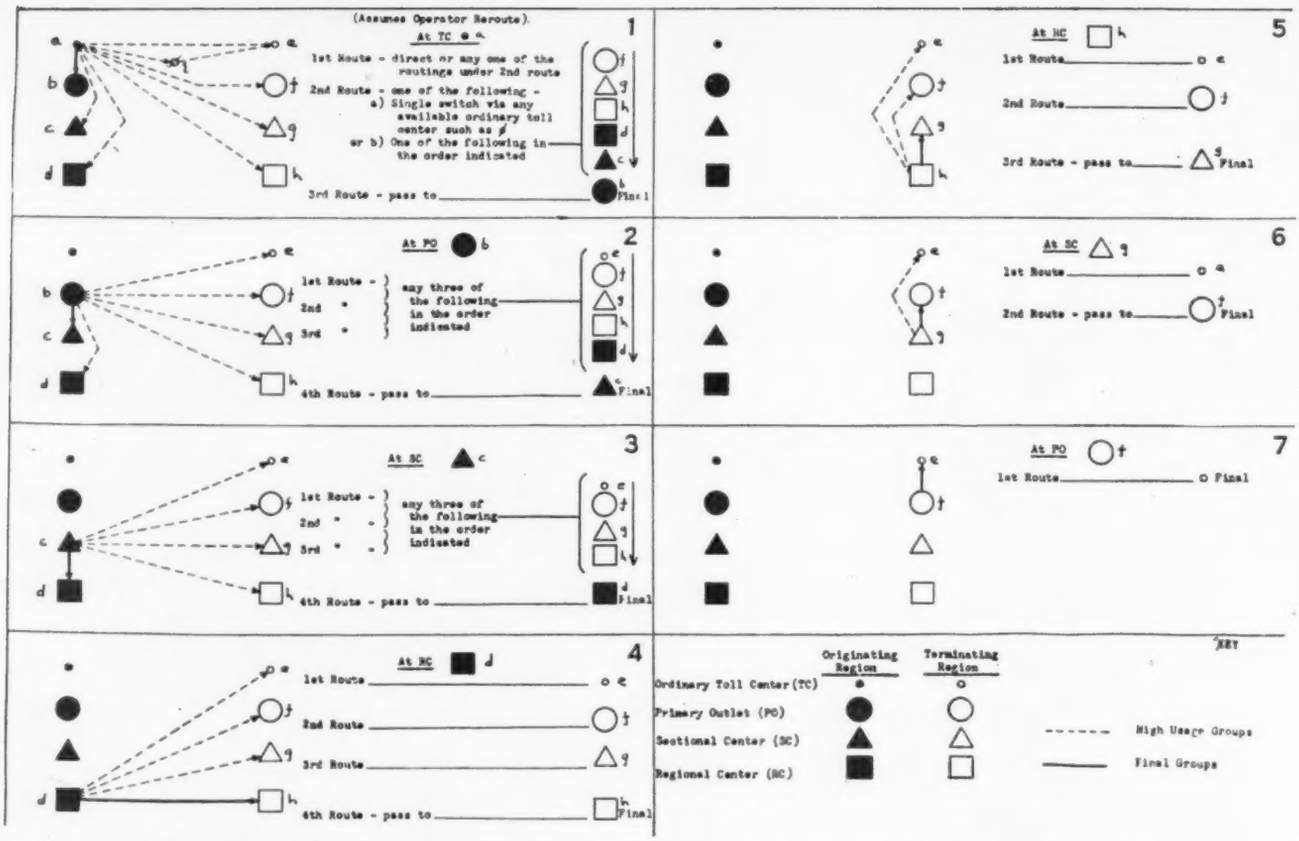


Chart A—The detailed routing pattern for calls between any two points can be visualized from this chart.

New TOLL SWITCHING Plan For NATIONWIDE Toll Dialing

THE NEWLY devised toll switching plan described in the following article will be of interest to telephone people everywhere. This plan was designed to supplement the Nationwide Operator Toll Dialing arrangement with which the readers of this magazine are generally familiar.

The Toll Dialing plan, it will be recalled, provides for the establishment of toll calls between two points, even though separated by the length or breadth of the country, under the control of an originating operator's dial or keyset and, in many cases, without the assistance of a second operator. The inauguration of the nationwide operator toll dialing plan contemplates the continued operation on a ring-down basis of those exchanges where conditions do not warrant conversion to dial operation. It will be practicable, therefore, for each company to decide for individual locations whether or not the service features are sufficiently attractive to justify providing equipment essential to Nationwide Operator Toll Dialing. Some of the switchboard equipment being manufactured today incorporates in its design features which will permit its use in the nationwide toll dialing scheme with a minimum of additional expenditures.

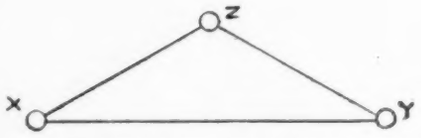


Fig. 1—Alternate routing.

The new toll switching plan for nationwide operator toll dialing makes greater use of alternate routes than heretofore practicable. When an all-circuits-busy condition is encountered on the first choice route at the originating toll center or at any intermediate switching point one or more alternate routes will, in general, be available for advancing the call. Alternate routes at intermediate switching points will be selected automatically in a predetermined order.

The new toll switching plan brings into our nomenclature several new terms including "Control Switching Points" (CSP), "home C.S.P.", "final" trunk groups and "high usage" trunk groups. No difficulty is anticipated in operating partly on the basis of the new plan and partly on the basis of the present plan.

The article describing the new toll switching plan was furnished to the USITA Dial Interexchange Committee by the American Telephone & Telegraph Company.

THESE NOTES discuss briefly the principal features of a proposed

switching plan for nationwide toll dialing.

The condition which the proposed switching plan is designed to meet is that in which the plant is on a dial basis both for local and toll. The purpose of the plan is to enable an outward toll operator to complete a call to any dial telephone in the nation, without the intervention of operators at intermediate points, by dialing a maximum of 10 digits. One additional digit, making a total of 11, may be required in the relatively few cases where party letters or numbers over 9999 are used in manual offices or where a ringing digit is involved in dial offices. The toll switching equipment will be arranged to accommodate this additional digit. Uniformly fast service between all communities, large and small, nearby or distant, is the objective.

The plan contemplates a new system of routing toll calls in which inter-toll trunks will be utilized at high efficiency by means which will at the same time reduce to a very small figure the chance of a call being delayed on account of all trunks busy. The realization of this objective will involve full exploitation of the capabilities of the dial equipment to try in rapid succession a first route and several predetermined alternate routes, the purpose being to advance the call over any of several suitable routes in which an idle trunk is available. This is called alternate routing. The economy of this system lies in the opportunities which it presents for deliberately engineering most trunk groups to carry only part of the load offered, the balance of the load overflowing successively to the other groups where it is combined with similar overflows from other sources, the whole design being coordinated and regulated in such a way that a call will be almost certain to find an idle path before it has run the complete gamut of the routes available.

It is expected that the cost of this system will be no greater (probably less) than if the present system of routing were to be continued (after dial conversion) with intertoll trunks averaging a Schedule "B" loading. In addition to the improved service aspect and possibly lower cost, the alternate routing feature of the plan makes it possible, to an extent heretofore not practicable, to take advantage of toll plant margins in one place to relieve bottlenecks in other places, thus improving plant fills and making it possible to use plant to greater advantage. Greater flexibility of routing and service protection are other important advantages. The substantially no delay feature of the plan makes the trunking arrangement satisfactory for nationwide customer toll dialing.

It is expected that the proposed plan can be readily coordinated with the present manual plan and no insuperable difficulties are anticipated in operating partly on the basis of the existing plan and partly on the basis of the new during the period of conversion from the one to the other.

Basic Differences Between Dial and Ringdown

BEFORE embarking on a discussion of the principles which support the proposed routing system, the features of which are outlined above, it will be profitable to take a broad look at those fundamental features and capabilities of dial operation which make it practicable and desirable to modify present toll routing practice. Table One lists six basic items and compares the conditions under dial and ringdown operation.

Physical Features Of Proposed Plan

THE PHYSICAL features of the proposed plan as now envisioned are as follows:

(1) The proposed general toll

Table I—Comparison of conditions between dial and ringdown operations.

Item	Ringdown Operation	Dial Operation
(a) Supervision on intertoll trunks	Non-through (1 lamp). Outward operator supervises call by means of lamp associated with calling line, by listening for start of conversation and by ringing signals from forward operators.	Through (2 lamp). Outward operator supervises call by means of two lamps, one associated with calling line and other with called line. By these lamps she is apprized of all events connected with the call.
(b) Cost per switch	High.	Low.
(c) Effect on service of switching	Slows service and causes errors.	Negligible delay (about 1.5 sec. per switch) and little chance of error.
(d) Type of switching equipment	2-wire.	2 or 4-wire as required.
(e) Routing control	It is necessary for operators to know (from bulletins or route guides) every intermediate point on the route and to build up connection point-by-point.	Called number contains all information needed for routing. Routing is entirely automatic after call is dialed into the equipment at a CSP. The equipment at each intermediate CSP will be capable of translating the digits of the called number into the information needed to select the first and alternate routes in predetermined order and of passing on to the next point the digits necessary to advance the call beyond that point. Except where the first leg is selected in the multiple the operator need not know what circuits or routes are used in handling the call.
(f) Alternate routing	Limited because done by operators.	Less limited because done by dial equipment.

switching plan is an evolution of the present plan, the principal features of which are retained.

(2) The proposed plan envisions two broad classes of toll centers: ordinary TC's and CSP's (control switching points).

(3) The CSP's are to be the intermediate switching points for multi-switch calls corresponding in a general way to the present primary outlets and regional centers. Three classes of CSP's are postulated:

Regional Centers (RC's) —Each serves a large area as at present. Each connected to every other regional center by a liberally engineered "final" trunk group (i.e., a group engineered to a loading of about P.03, on the average, the exact loading depending on circumstances). Four-wire switching required.

Sectional Centers (SC's) —This is a new classification. It serves an intermediate role between the regional center and primary outlet. Each SC where established would serve an area comprising part of a regional area. It would embrace the area served by several primary outlets. Each SC would be connected to a home RC by means of a liberally engineered "final" trunk group. Four-wire switching required.

Primary Outlets (PO's) —Each serves a part of a sectional or regional area. Each is connected to its home SC or RC by means of a liberally engineered "final" trunk group. Two or four-wire switching applicable depending on cost considerations.

(4) All toll centers not designated as CSP's (including present primary and secondary outlets and secondary switching points that are not made CSP's) will become ordinary toll centers limited to single switch traffic. Each TC will be connected to its home PO (or SC or RC) by means of a liberally engineered "final" trunk group. Two-wire switching and step-by-step, crossbar or other types of equipment applicable. Gain arrangements may be provided if desired for use on single switch connections through the TC.

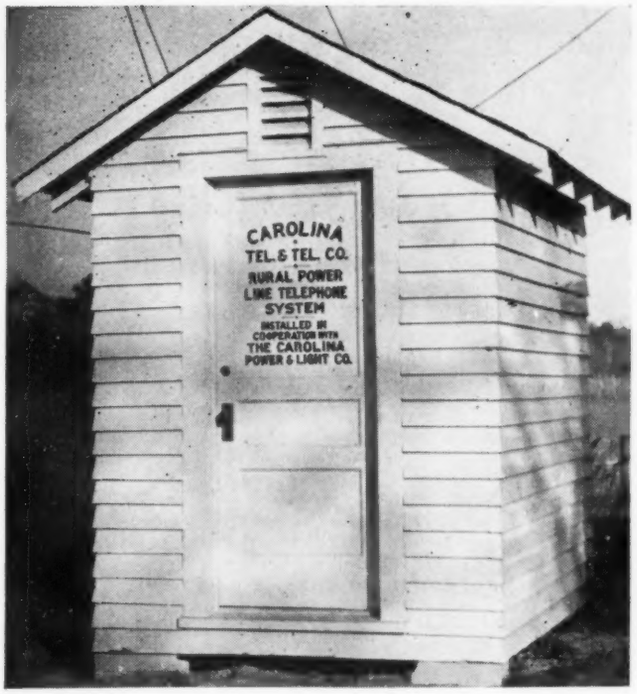
"WOW!! I mean which telephone bill do I pay my floor on?"

(5) CSP's must be provided with sender features as well as gain control features. It is proposed in the Bell System to provide these common control switching arrangements with crossbar toll switching equipment. Other types of dial equipment may be used where common control switching arrangements are required so long as provision is made for coordinated operation with other equipment in the nationwide toll dialing system.

(6) In addition to the basic network of liberally engineered "final" trunk groups referred to above (i.e., RC to RC, SC to home RC, PO to home SC or RC, TC to home PO, SC or RC), "high usage" groups (i.e., groups engineered to operate on the basis of high loading) will be provided between pairs of points in all categories to the extent justified by traffic. The number of high usage groups is entirely flexible, the controlling consideration being one of cost; that is, high-usage trunks will be provided between two places up to the point where the number of calls carried per additional trunk is so low that it is cheaper to route the calls it would carry if provided over an indirect (alternate) route involving a switch. This is explained more fully below. The number of high usage groups will greatly exceed the number of "final" groups.

(7) It is believed that there will be about 200 CSP's. Some present gain centers are expected to become ordinary TC's and some places that are now TC's are expected to become CSP's. Very broadly, the selection of CSP's involves balancing the added cost of providing CSP features against the savings in trunking costs, the purpose being to select a combination of CSP's which results in the lowest over-all cost.

(The preceding article will be concluded in the July issue of TELEPHONE ENGINEER and MANAGEMENT. The Dial Interexchange Committee of the United States Independent Telephone Association considers that this discussion of new and important developments in toll switching, merits close study by all Independent telephone companies.)



House for M-1 carrier terminal, Nashville, N. C.

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RURAL SERVICE via Power Line Carrier

by

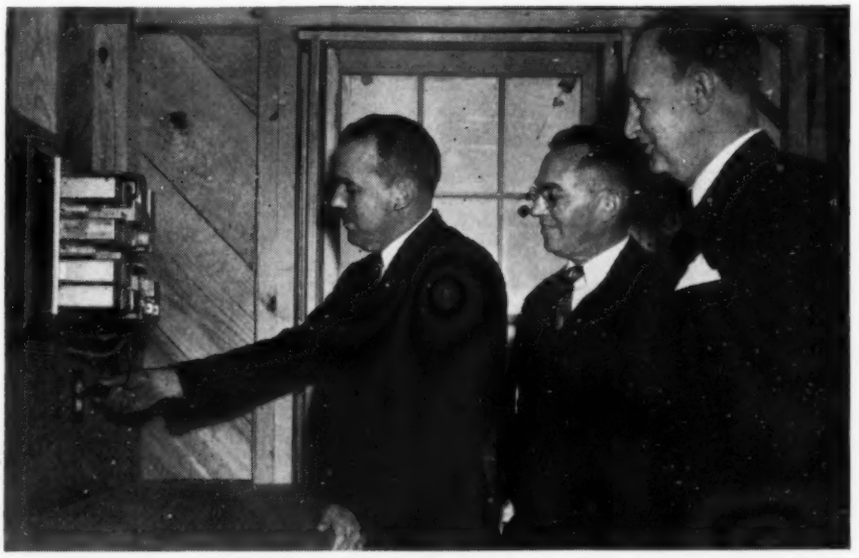
L. W. HILL

President, Carolina T. & T. Co.
Tarboro, N.C.

★

THE FIRST rural telephone service provided by power line carrier in North Carolina was cut into service Friday, February 7, 1947, at Nashville, North Carolina, by Lt. Governor L. Y. Ballentine during the dedication program attended by officials of the many interested groups. This service, which makes use of the existing power lines, was installed by the Carolina Telephone & Telegraph Company with the coopèration of the Carolina Power & Light Company to make telephone service available to an increased number of rural homes.

Recognizing the importance of the development of the power line carrier system to rural people, officials of government, farm organizations, and industry gathered at the New Ricks Hotel, Rocky Mount, North Carolina, at noon for the dedication luncheon. L. W. Hill, president of the Carolina Telephone & Telegraph Company described the system to the group.



Lt. Governor L. Y. (Stag) Ballentine plugs in carrier equipment on Nash County installation of rural power line carrier telephone system. Looking on are L. W. Hill, president, Carolina Tel. & Tel. Co. and L. V. Sutton, president, Carolina Power & Light Co.

The system, known as the Western Electric M1 Power Line Carrier Telephone System was developed by Bell Telephone Laboratories and involves the use of electric power wires simultaneously for power service and telephone service. This is accomplished by the use of high-frequency currents which are popularly described as "carrying" the telephone conversations. "Couplers", "Chokes" and other specialized facilities perform the job of getting the telephone currents onto and off the wires as well as adapt the power line for proper carrier performance.

The telephone instrument itself is much like the conventional telephone instrument and the subscriber uses it as he would any other.

Mr. Hill explained that it has always been the Carolina Telephone & Telegraph Company's policy to further rural service as much as possible and that the installation of the M1 Power Line Carrier Telephone System was another step toward this goal. He voiced the belief that the development of this new system opens the possibility of rendering telephone service in rural areas which otherwise could be served only by the provision

of costly and extensive pole line and wire construction.

M. E. Hollowell, farm agent for Nash County, voiced his approval of the new service in saying, "This service gives the farmer everything the city people have except the noise. The telephone is now a part of our way of life and the rural people are entitled to this service as fast as possible."

W. W. "Cap" Eagles, president, North Carolina Farm Bureau, said, "The extension of telephone service to the isolated rural areas is the finest thing that can be done for the people in the country. It proves that industry is not against agriculture."

After a luncheon the group travelled by cars to the Common terminal hut, outside Nashville, N. C. At this junction point the telephone lines were connected to the power lines. Lt. Governor Ballentine threw the switch placing the system into operation.

Next the party went to the home of Mrs. George King where Lt. Governor Ballentine placed the first long distance call over the system to Governor Cherry of North Carolina. Various ones talked over the telephone and expressed their satisfaction as to the performance of the system.

The M1 Carrier Telephone System at Nashville, N. C. utilized one carrier channel with frequency assignments of 185 KC for transmission from the common terminal to subscribers and 290 and 300 KC for transmission from the subscribers to the common terminal. (The normal frequency being 290 KC: 300 KC used for reverting calls). Six stations were initially installed over sixteen miles of power line.

In attendance at recent North Carolina inaugural of rural telephone service by power line carrier were: 1st row—left to right: W. W. Eagles, president, N. C. Farm Bureau; L. W. Hill, president, Carolina Tel. & Tel. Co.; O. B. Moss, Senator, Nash County; L. V. Sutton, president, Carolina Power & Light Co.; W. G. Clark, director, Carolina Tel. & Tel Co.; L. Y. Ballentine, lieutenant governor, North Carolina; Milliard F. Jones, director, Carolina Tel. & Tel. Co.; and Frederick Cooper, mayor pro-tem Nashville.

Second row—left to right: W. C. Darrow, com. & traffic mgr., Carolina Tel. & Tel. Co.; H. Dail Holderness, vice pres., sec. & treas., Carolina Tel. & Tel. Co.; J. F. Havens, ass't. com. mgr., Carolina Tel. & Tel. Co.; L. E. Walker, ass't sales mgr., Graybar Electric Co., Richmond, Va.; N. C. Cooper, Carolina Power & Light Co.; C. J. Marcom, Carolina Power & Light Co.; F. W. Dickerson, Graybar Electric Co.; Blair Jenkins, communications eng., Carolina Power & Light Co.; J. T. Sadler, auditor, Carolina Tel. & Tel. Co.; H. B. Robinson, vice president, Carolina Power & Light Co.; F. F. O'Keefe, Western Electric Co., Winston-Salem, N. C.; M. E. Hollowell, Farm Agent, Nash County; William C. LaRue, ass't editor, "Progressive Farmer"; Harry L. Parker, Western Electric Co., New York, N.Y.; E. N. Pope, publicity director, Carolina Power & Light Co.; C. R. Jones, ass't chief engineer, Carolina Tel. & Tel. Co., and D. F. Holliday, group manager, Carolina Tel. & Tel. Co.

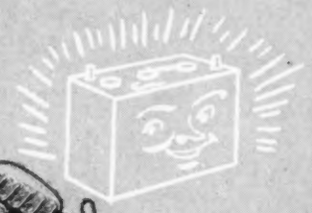
The common terminal is located about one mile out of Nashville which is a 35-E-97 office. Rocky Mount, North Carolina the toll center for Nashville, is an additional ten miles away. The voice frequency loop be-

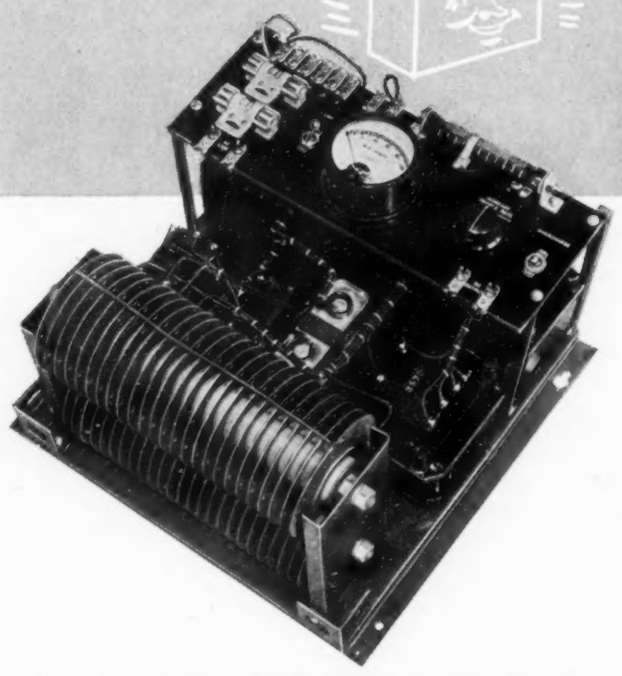
(Please turn to page 58)

(Left photo): Lt. Governor L. Y. (Stag) Ballentine making first long distance call from residence of Mr. and Mrs. George King, Nash County, with L. W. Hill, president, Carolina Tel. and Tel. Co., Inc., and W. W. Eagles, president, N. C. Farm Bureau, looking on. The call was to the Governor's office in Raleigh. (Right photo): Mrs. George King making first local call over power line carrier telephone system with D. F. Holliday, group manager, looking on.

2 WAYS TO TREAT BATTERIES...

1. KEEP THEM IN TOP CONDITION





In main exchanges where batteries are a must, it pays to keep them in top condition, fully charged. The Raytheon RECTICHARGER accomplishes this while carrying the normal current demand, and offers these plus advantages:

DC STABILIZER, magnetic, non-wearing, automatically provides constant voltage output regardless of variations in load.

AC STABILIZER, also magnetic type, makes unit independent of AC line fluctuations from 95 to 130 volts.

DRY DISK RECTIFYING UNITS for long life, no expendable parts.

CORRECT TRICKLE RATE, output adjustable to meet battery manufacturer's recommendations.

OVERCHARGE SWITCH permits application of equalizing, soaking or freshening charge to battery.

INTERIOR PARTS ACCESSIBLE—cover readily lifted by removing screws.

Write for Bulletin DL-RCR-506

2. GET RID OF THEM

For supplying DC power to PBX and PAX boards, large independent telephone companies are replacing worn batteries with Raytheon RECTIFILTERS. Over 12 years (since 1934) experience has taught them that the Raytheon Rectifilters:

OUTLAST BATTERIES many times.

ELIMINATE TROUBLE and expense of routine service for battery inspection.

RELEASE WIRE carrying charging current from the central office to subscribers' PBX boards for revenue producing service.

MINIMIZE POWER COST because of high efficiency in converting AC to DC.

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RAYTHEON

RAYTHEON MANUFACTURING COMPANY

Industrial Electronics Division, Waltham 54, Massachusetts

Excellence in Electronics

★ PART FOUR

MODERN TESTING INSTRUMENTS

by

B. C. BURDEN

IN PART IV of the series on "Modern Testing Instruments" Mr. Burden discusses transmission measuring arrangements, simple method of measuring impedance and the use of the cathode ray oscillograph.

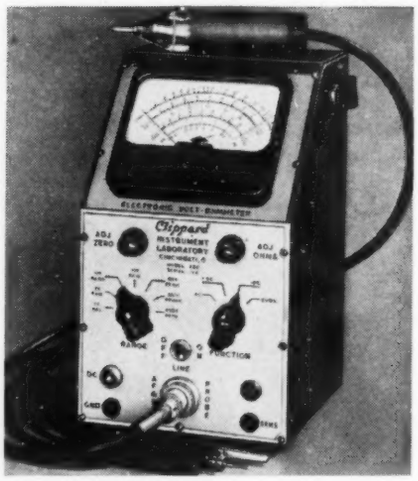

Fig. 21—All Purpose Vacuum Tube Voltmeter Equipped with Power Level Decibel scale for Transmission Measurements. (Courtesy Clippard Instrument Laboratory).

Transmission Measuring Set-Up

THE usual arrangement for measuring transmission consists of a 1000 cycle oscillator usually mounted on the main frame or relay rack at the central office (output usually odb) and one or more portable transmission level indicators which can be carried by troublemen to check the overall transmission between the central office and the subscriber's premises. The same arrangement can be used to feed energy into a toll line and to measure the attenuation loss of the toll line at some distant office. Fig. 20 illustrates how the measurements are made. A 600 ohm line terminating is usually used.

The transmission level meters used are generally calibrated in terms of a *zero reference level* of 1 millowatt (0.001 watt). One millowatt corresponds to approximately 0.775 volts when measured across a line terminated in 600 ohms. The overall loss of the line or equipment under measurement is shown directly on the transmission level indicator. For example, a reading of a negative 10 decibel (-10 db) with an input of 0 decibels at the central office would show the overall loss of the line to be 10 decibels.

Transmission measurements are preferable to simple ohmmeter measurements in determining the transmission performance of a line as the simple resistance measurements often fail to detect certain types of transmission trouble due to equipment connected across the circuit or to an excessive amount of small gauge cable.

Transmission measurements can be made without transmission level meters by using ordinary copper oxide a-c voltmeters. When a voltmeter is so used the readings obtained can be converted to decibels by computing the power level ($P = E^2 Z$) and then finding the ratio of the power received to the power sent. After the power ratio is determined the loss or gain in decibels can be readily obtained from a power ratio-decibel table.

An instrument well suited to transmission measurements of all types as well as resistance, voltage and current measurements, is shown in Fig. 21. It utilizes a vacuum tube rectifier and has a number of voltage, resistance and current scales

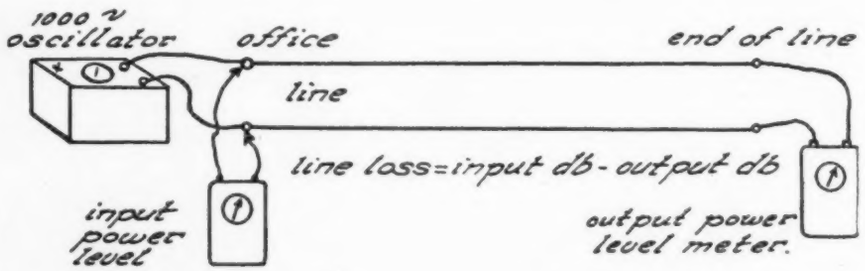

Fig. 20—Use of power level meters and a 1000 cycle oscillator for transmission measurements.

including one scale calibrated in decibels.

Impedance of Telephone Equipment

IN DEALING with the more technical phases of telephone work we need to understand and be able to measure the impedance of telephone lines and equipment. This is particularly true with respect to equipment such as voice frequency repeaters, carrier systems, etc. The *impedance* of any electrical device is the total impeding effect which it offers to the flow of alternating current. The impedance in ohms of a simple series circuit containing *resistance* (R) and *reactance* (X) is computed by the equation:

$$Z = \sqrt{R^2 + X^2}.$$

The reactance represents the retarding effect due to inductance or capacitance. The resistance (effective) offered to the flow of alternating current is dependent not only on the ohmic resistance of the conducting material but also to the power absorbed due to eddy current, magnetic hysteresis or dielectric losses. The *effective resistance* of an alternating current circuit is usually higher than the d-c ohmic resistance of the same circuit.

Telephone lines and equipment have a *characteristic impedance* which can be stated either as an absolute value at an angle of lead or lag or in terms of the resistance and reactance values, that is:

Polar Value = $Z\angle\varnothing$

Rectangular Value = $R + jx$

Impedance Matching Requirements

IT IS usually desirable that the impedance of load and source circuits be matched as closely as possible in order to insure a *maximum transfer of energy*. The matching of impedances also minimizes "reflection effects" which tend to cause distortion and reduce the gain at which repeaters can be operated. (See Fig. 22.)

One of the principal uses of impedance measuring equipment is in connection with *impedance irregularties* of telephone cable and open wire. Impedance irregularities are caused by faulty connections or condition of

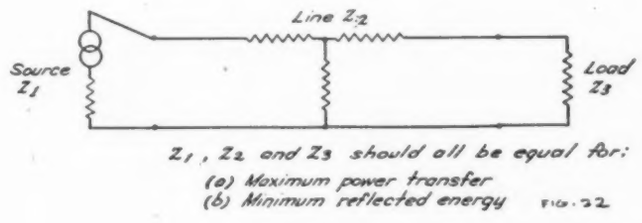

Fig. 22—Effect of a mismatch between load and source impedances in telephone circuits.

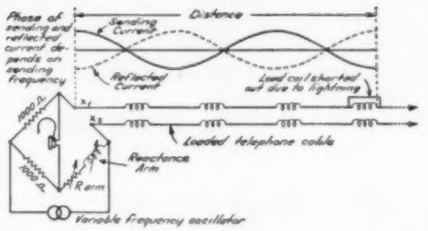

Fig. 23—Location of impedance irregularities by impedance measurements at various frequencies.

equipment, as for example, shorted or reversed loading coils; or to the connection of equipment having an impedance which does not match the impedance of the line to which it is connected.

Impedance irregularities can be located by measuring the impedance of the telephone line over a range of frequencies. The location of the irregularity (see Fig. 23) is accomplished by taking into account the finite time required for a given frequency to travel from the sending end of the line to the irregularity and then back (due to reflection) to the sending end. The reflected wave affects the magnitude of the impedance as measured at the sending end of the line, depending on whether the reflected wave arrives in-phase, or out-of-phase with the impressed wave from the variable frequency oscillator. The frequency is varied and measurements taken for each frequency over a wide range (400-4400 cycles). This information is plotted and used in conjunction with an equation to compute the distance to the impedance irregularity.

Simple Method of Measuring Impedance

THE MAGNITUDE of the impedance of a circuit or piece of equipment can be determined approximately by means of the simple substitution circuit shown in Fig. 24. With this method, a variable resistor is connected in series with the unknown impedance and an oscillator. The oscillator is set for the frequency at which the impedance is to be measured. The variable resistance is then adjusted until the potential drop across the variable resistor and across the unknown impedance are equal as shown by a high impedance voltmeter. When the voltage is balanced across the resistance and unknown impedance the magnitude of the unknown impedance is found equal to the value of resistance cut into the circuit by the variable resistor. An ordinary ohmmeter can be used to measure the setting of the variable resistance. This method is useful only for rough work and gives only the absolute value of the impedance.

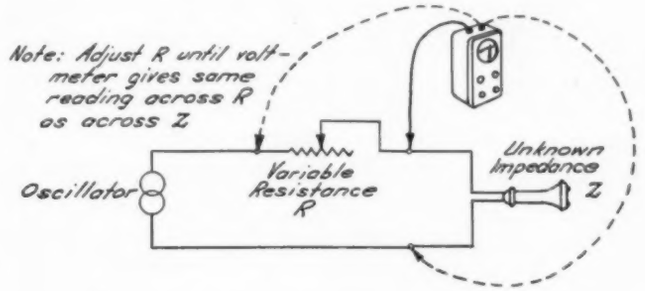
Note: Adjust R until voltmeter gives same reading across R as across Z
Oscillator
Variable Resistance R
Unknown Impedance Z

Fig. 24—Simple substitution circuit for measuring an unknown impedance.

The Impedance Bridge

TO MAKE accurate impedance measurements a bridge capable of measuring both reactance and effective resistance should be used. Fig. 25 shows a simplified circuit of the type of bridge commonly used for impedance measures. It consists of an a-c oscillator, a decade resistance box having a range of 0 to 11,110 ohms, balanced "A" and "B" arms consisting of two 1000 ohm non-inductive resistances, a variable inductance with a range of +50 to 400 millihenries and several fixed inductances that can be connected in either the "X" or the "R" arms. When making a measurement, the variable reactance and resistance arms of the bridge are both adjusted for minimum tone in the receiver. Under this circumstance the setting of these variable units represents the unknown impedance components. The actual impedance (Z) can be determined by substituting these values in the impedance equation previously given.

The Cathode Ray Oscillograph

THE CATHODE ray oscillograph (see Fig. 26) is an electronic device useful as a high impedance voltmeter, as a means of analyzing

(*Please turn to page 78*)

★ *TELEPHONE ENGINEER and MANAGEMENT'S*

Washington

BUREAU REPORTS

by
ROLAND C. DAVIES
and
FRED HENCK

ALTHOUGH THE new White-Wolverton Bill to revamp the Communications Act of 1934 and reorganize the Federal Communications Commission is not being hailed in telephone or communications common carrier circles as a "Magna Carta"—a depiction generally dusted off by broadcasters whenever any measure proscribing FCC regulation comes up—it probably will have some important effects on those telephone companies operating under Commission jurisdiction if and when it becomes law.

The major provision of the measure affecting communications regulation is the one providing the establishment of two distinct and separate FCC divisions, one for common carrier and the other for broadcast. Under the bill, the full FCC would maintain jurisdiction only over some overall policy matters, such as frequency allocation and selection of personnel, as well as some items such as emergency radio services which do not fall clearly into either category. Matters relating to common carrier operation, however important they might be—such as rate cases, separation, or whatever might come—would be under that division.

Thus the makeup of the divisions, which would be selected by the Commissioners themselves, could be of paramount importance. Obviously, the fact that such generally-hailed moderates and keen students of communications as Commissioners E. K. Jett and E. M. Webster are on the FCC would avail nothing to either industry unless such FCC members were on the appropriate division dealing with the industry's problems. While none of the present members of the Commission could be considered particularly inimical to business, with one possible exception, the day might come when either broadcasting or common carrier interests emphatically would regret that a particular Commissioner would have one vote out of three in matters dealing with their industry instead of one out of seven.

Registration desk at recent Indiana Telephone Association covention was a busy spot on opening day.

Under the bill, also, the post of the FCC Chairman would be something akin to that of a "messenger boy," and great difficulty might be occasioned in finding a qualified man to take the assignment. It would also mean, of course, that an outstanding FCC Chairman, if he accepted and retained the job, would be of little benefit to the operations of the Commission. Since the Chairman would not be a member of either division, and would be selected by the Commissioners themselves for terms of one year at a time, career men probably would prefer to head one of the divisions.

The White-Wolverton Bill is not likely to become law this week or this month, or even in this session of Congress, however, and these items no doubt will be ironed out before it reaches the House and Senate chambers. Already the broadcasters—at another of the "crossroads" they reach every day or so—are picking the measure to pieces and making pronouncements that hearings had better wait until much later, when everyone has a chance to study the bill at considerable length. A decision on hearings had not been reached as TELEPHONE ENGINEER & MANAGEMENT went to press, but it is thought almost certain that they will be launched first on the Senate side, as Senator White, Chairman of the chamber's Interstate and Foreign Commerce Committee, drafted the bill. On the House side, Rep. Wolverton, who heads that body's comparable committee, merely introduced a duplicate of the White measure.

WITH THE communications industry receiving the "pole position" in the hearings of the House Ways and Means Committee on overall revamping of the entire tax structure, the excises paid by communications service users were pounded hard by a trio of industry representatives—General Telephone Corp. President Harold V. Bozell, Chairman of the USITA Tax Committee, A. T. & T. Assistant Comptroller Harry C. Gretz, and Western Union President Joseph L. Egan. The communications industry officials appeared as the first business representatives on the Committee's schedule, immediately following the Treasury Department spokesmen.

Indications after the hearing were that a bill lowering some of the present

excises might be offered within a short time, although the Committee's proposed overall revision of the nation's tax program will not come until the next session of Congress. In the communications field, however, the emphasis of this year's relief probably will be on Western Union. At least a minor reduction in local and toll telephone excises may come as a result of the excellent pleas of Mr. Bozell and Mr. Gretz, however.

Both the Independent and Bell System spokesmen urged the immediate repeal of the 15% excise on local service and toll messages of 24 cents and under in recognition of the fact that this levy is a tax upon a necessary business and social service and not a tax on luxuries or entertainment. Reduction of the 25% toll telephone tax—for messages costing 25 cents or more—also was requested, provided that Congress does not see fit to remove such services from the luxury class by complete repeal of the levies. Both Mr. Bozell and Mr. Gretz emphasized that, when the final postwar tax bill is enacted, it should provide for the complete elimination of all excise taxes on communications services.

Mr. Gretz drove home to the committee that the excise taxes are a heavy burden to both the public and telephone companies—stressing that the Bell System alone last year spent more than $1 million in collection and bookkeeping costs in connection with the levies, and that this drain had been felt most in the detailed operations necessary in computations on local billing. Along with Mr. Bozell, he also brought out that the segment of the population most affected by the excises is that in rural areas, preventing programs of the telephone companies to expand service to this subscriber classification.

Both telephone industry representatives gave graphic reviews of the growth of excise taxes and were felt to have made a profound impression on members of the committee in their comparison of the levies on an essential service, such as long distance telephone, with the lower taxes on furs, jewelry, and cosmetics, and the contention that improvement of facilities is hampered by the high 15% excise rate on local service.

Separation Proceeding

IN CONFERENCES between members of the FCC and Chairman Matt L. McWhorter of the NARUC Telephone Committee, the Federal Commission indicated its willingness to continue its separation docket on a cooperative basis. The cooperative proceeding was one of the recommendations of the Staff Committee approved by the State Commissioners in St. Louis last month, and the conferences occurred at a meeting in Washington, D. C., to lay plans of the NARUC for further action on the subject.

Results during the Washington meeting included: a letter to the A. T. & T. advising of the changes in separation methods approved in St. Louis and requesting that the changes be made effective as soon as possible; indication that the FCC has no objection to the changes, although its approval was formally withheld because of its pending proceeding in the matter; assignment of the Staff Subcommittee to rewrite the approved methods, incorporating the changes; a letter to all state commissions with board-to-board tariff definitions asking their consideration of modifying the tariffs, so they will show only the station-to-station basis; and request to the A. T. & T. for information regarding toll terminal costs, toll line costs, revenue and traffic reports, and rates of return by states. The A. T. & T. will consider the request and a meeting will be staged with the Staff Subcommittee to discuss details.

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STRONGER THAN THE LINE ITSELF
The NICOPRESS Way
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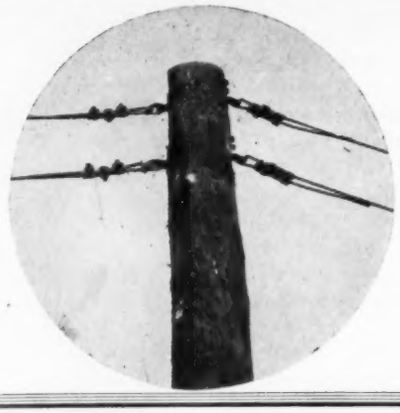


★ TELEPHONE ENGINEER and MANAGEMENT'S

PRACTICAL--

"HOW TO DO IT"

SUGGESTIONS . . .

TROUBLE OR SERVICE! . . .

SOME UTILITIES have found that there is a right and wrong designation for their various services and activities. Many power companies, for example, have long used the word "trouble department" or "complaint department" in connection with this phase of their activity. Many of them have renamed these departments "customer service" which they feel is more pleasing to the public.

Their effort is to emphasize **service** rather than the difficulties that sometimes occur in its rendition. The old familiar sign above the cashier's window which reads "Pay Bills Here" is being replaced by some progressive companies with a sign reading "Customer Accounts". Discarded along with the old type designations should be the practice of service clerks greeting counter customers with a "yes" rather than "may I be of help?"

◆

SIMPLE LOW-COST D-C POWER SOURCE . . .

THERE IS occasionally need for direct current in certain types of telephone testing. While this is normally obtained from dry "B" batteries, a rectifier is oftentimes more convenient. The new small size selenium rectifier units which are available at approximately $1.00 each permit a simple low cost a-c to d-c rectifier system to be built. These power supply units can be built either with or without an isolating transformer. The isolating transformer merely isolates the grounded side of the power line from the d-c output circuit which is advantageous for certain types of testing.

Fig. 1 shows two circuits which may be used, one using a single rectifier and having a maximum output potential of approximately 140 volts; the other uses two rectifier units and has an output of 275 volts. By the use of a variable wire-wound potentiometer the output voltage can be adjusted to any desired value.

◆

HAND TOOL EMPLOYS EXPLOSIVE POWER . . .

A NEW TOOL, designed to simplify the attachment of electrical equipment or other items to steel, concrete, brick or mortar surfaces, makes use of an explosive cartridge in a mechanism similar to that of the ordinary gun. The force of the explosion drives a steel pin or stud down through a short barrel and into the steel or masonry surface with force sufficient to "set" the stud firmly into the supporting surface. In addition to driving pins, which are used mainly for fastening purposes, both male and female threaded studs are available to accommodate bolts or threaded rods. This new and revolutionary hand tool is known as the Tempo-tool and is available in three models. It should be of interest to telephone companies for use in the installation of conduit and cable on brick and masonry buildings and other similar purposes.

◆

THE CRITICAL TEN FEET . . .

AN ANALYSIS of the causes of cable faults by the Bell Telephone Company of Pennsylvania has shown that over 50% of all aerial cable sheath breaks occur within 5 feet of the pole

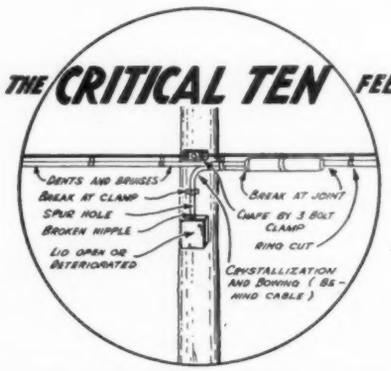


Fig. 2—Various common causes of cable trouble in the "critical" 10 feet.

attachment and can readily be detected by visual inspection. In recent plant meetings the attention of cable repair men has been focused on these various causes of cable trouble close to the pole. Fig. 2 illustrates the various common causes of cable trouble in the critical ten feet as set forth in the Bell plant discussions.

Outside maintenance men should be instructed to be on the alert for sheath breaks whenever they have occasion to climb a pole. Defective places in the cable should be promptly reported to the wire chief.

◆

CURBSIDE PAYMENT BOX . . .

EVER on the alert for ways to give customers better service, the Indiana Bell Telephone Company in Indian-

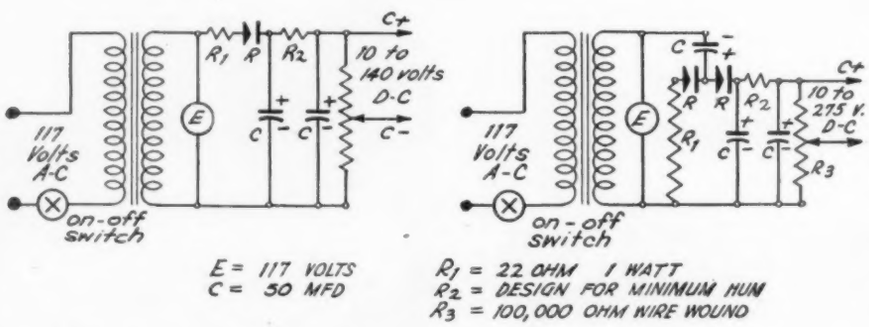


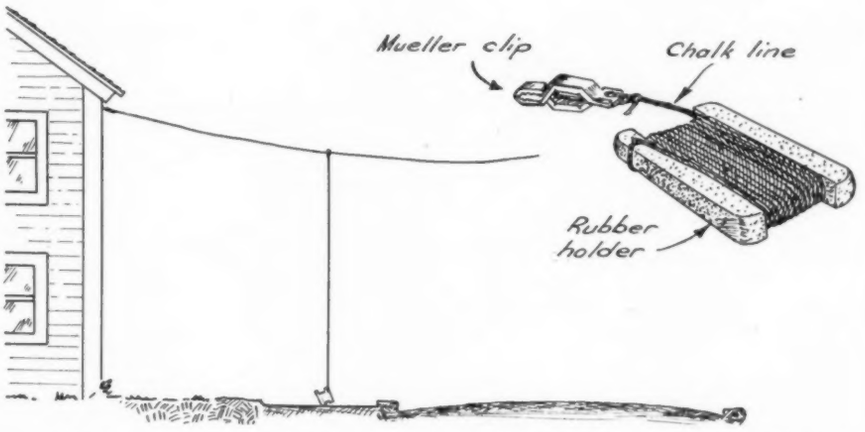
Fig. 1—Two circuits that may be used to supply DC power source.

apolis recently installed a curbside box for the payment of subscribers' bills. Located directly in front of the office the box can be reached without the subscriber leaving his car. The curb carries a "no parking sign" so that subscribers in cars can pull in at any time. They can deposit payments and not have to worry about parking space. The box is also found convenient by subscribers on foot who reach the office after it is closed and wish to leave their payment. This special service wrinkle has attracted considerable attention and an item recently appeared about it in Business Week. It was even mentioned by Kate Smith on one of her broadcasts.

◆

USEFUL CLEARANCE TOOLS . . .

BELL System outside plant men now are supplied with a special clearance measuring tool which is used to measure the height of drops and open wire above ground. The tool is very simple and it can be easily improvised as shown in the accompanying sketch. It consists of a rubber holder, a chalk line and a modified test clip. An ordinary Mueller test clip with the teeth flattened will work very satisfactorily. The length from the top of the clip to the bottom of the holder when unwound is 18 feet.



Special clearance measuring tool which is used to measure the height of drops and open wire above ground.

In placing new drops the clip is attached to the wire at the point at which it is desired to know the clearance. The drop is then pulled into place and given sufficient tension to insure adequate minimum clearance. After the drop is installed the clip can readily be jerked loose without harm to the drop.

When used in checking the clearance on existing open wire or drops, the rubber holder is tossed over the wire to be measured and then pulled back up to the point where the end of the line is just touching the top of the wire. Here is a simple effective tool that is much easier to use than fish poles for measuring wire clearance and every truck should be equipped with one of these useful devices.

◆

PRIVACY OF COMMUNICATION . . .

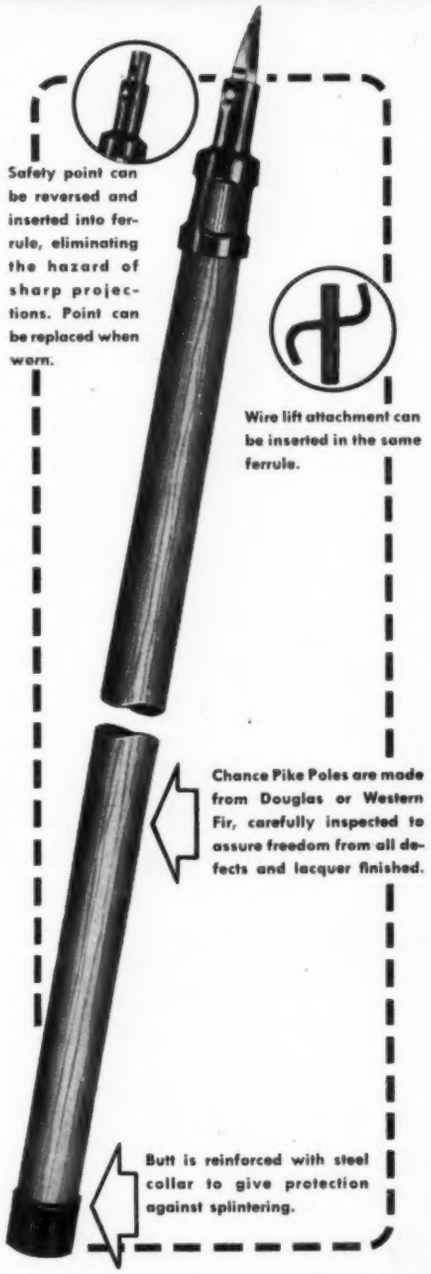
THE TELEPHONE industry has long prided itself on keeping strictly confidential the messages which pass over its wires. With dial equipment this comes about mechanically as there are no telephone operators to listen. In manual systems strict supervision and rigid rules minimize listening and some manual feature boards automatically prevent an operator from eavesdropping on a completed connection.

The recent introduction of moblie radio into the telephone picture raises the question, "What about the secrecy of communication?" Speech scrambling equipment is of course available but the cost is high and its application to a large number of mobile units, difficult and expensive. But it, or some similar equipment, may eventually be found necessary to insure a communication system that will continue to be strictly confidential regardless of whether it is a wire or radio link.

The question of secrecy is raised by a recent divorce proceeding which resulted from a conversation overheard by a business man over a cab loud speaker (not a common carrier radio system).

Possibly mobile radio telephone service users may have to learn, as have thousands of farmers on rural multi-party lines, that nothing should be said over a party line (radio or otherwise) that one would not publish in the local newspaper.

CHANCE
PIKE POLES
with Reversible
"SAFETY POINT"


Safety point can be reversed and inserted into ferrule, eliminating the hazard of sharp projections. Point can be replaced when worn.
Wire lift attachment can be inserted in the same ferrule.
Chance Pike Poles are made from Douglas or Western Fir, carefully inspected to assure freedom from all defects and lacquer finished.
Butt is reinforced with steel collar to give protection against splintering.

Chance Safety Pike Poles are used for raising telephone and power poles and as ground braces in pole setting operations. With the Wire Lift Attachment they are recommended for maneuvering telephone, and low voltage secondary conductors, into position.

Ferrule and pike may be purchased separately.

C4712

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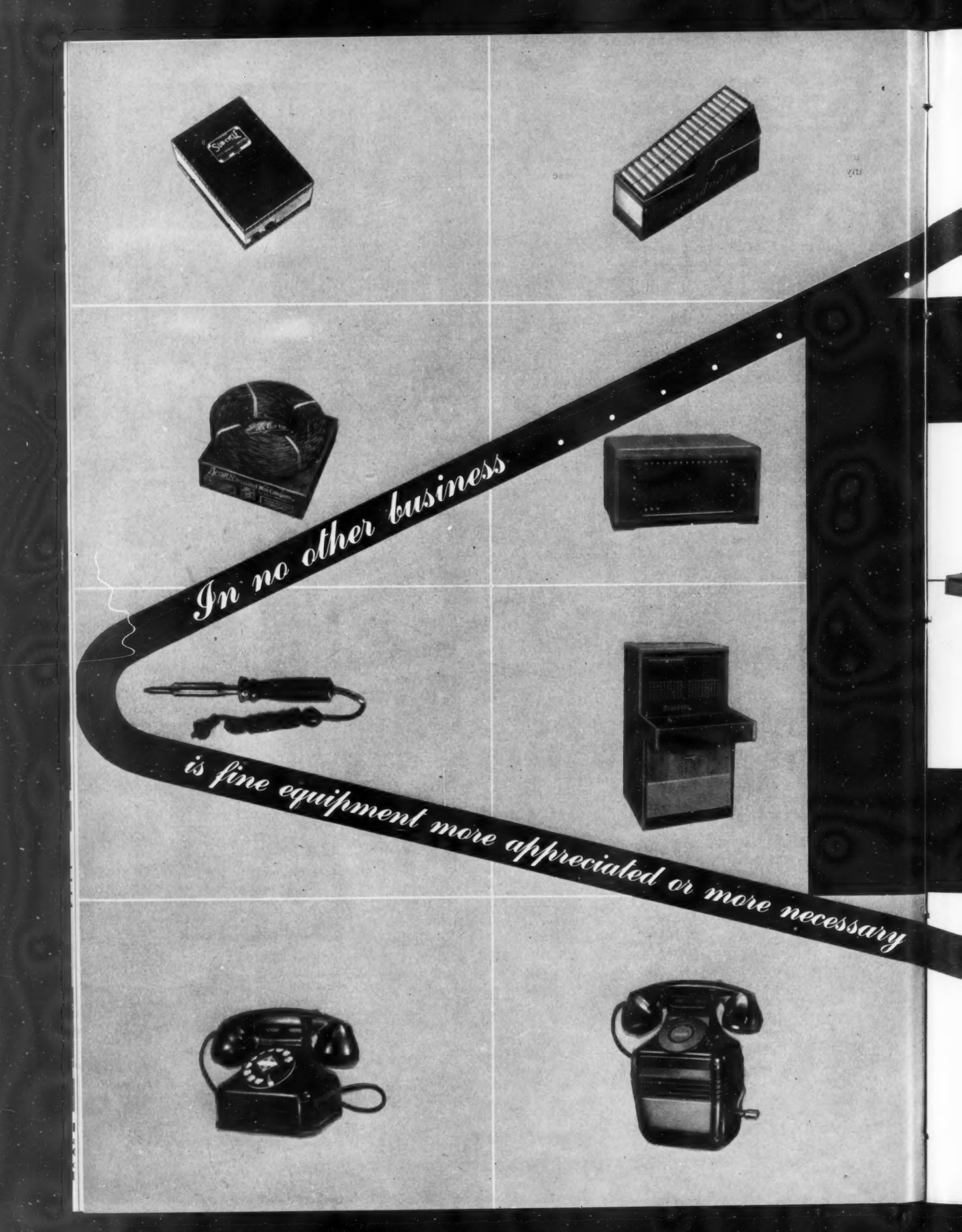
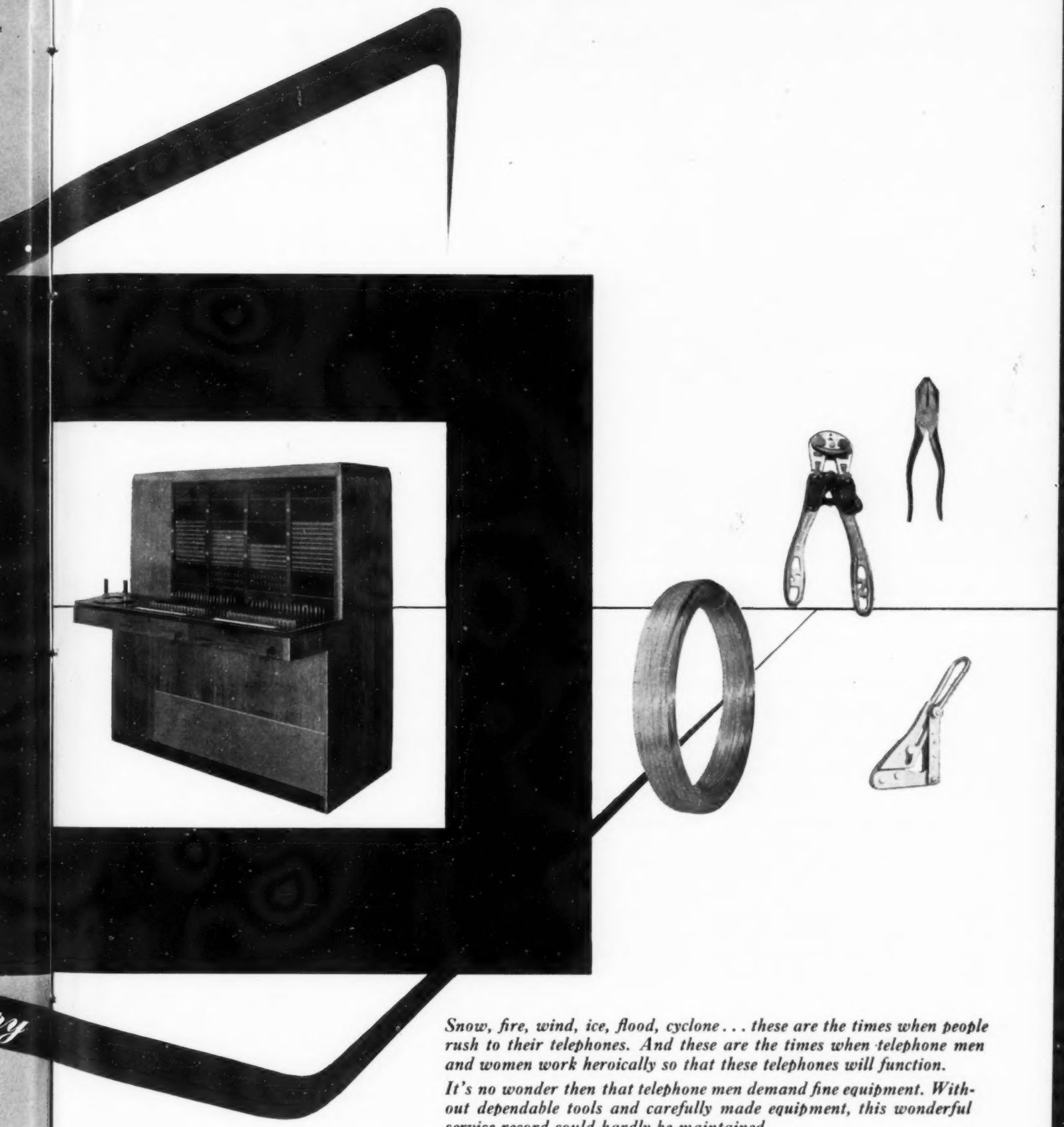

In no other business
is fine equipment more appreciated or more necessary



Snow, fire, wind, ice, flood, cyclone . . . these are the times when people rush to their telephones. And these are the times when telephone men and women work heroically so that these telephones will function.

It's no wonder then that telephone men demand fine equipment. Without dependable tools and carefully made equipment, this wonderful service record could hardly be maintained.

The things we make and sell here at Leich are made and sold with that thought in mind. Our understanding is . . . that telephone people want, and need, and will have . . . only the best.

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LEICH MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

SoundScriber recorder in operation. This machine can also be used for dictation and recording of conferences.

TELEPHONE RECORDING -- As I See It

By

LINCOLN THOMPSON

President of The SoundScriber Corp.

The importance of recorded messages to the telephone industry is growing each day. This article is from the pen of one of the largest manufacturers of telephone recorders, and his views from the manufacturer's viewpoint should be of real value to our readers.

THE IDEA of telephone recording is by no means new. In the earliest days of the telephone, many patents were issued which combined the then-known methods of recording with the telephone. As a matter of fact, a telephone-microphone offered the first possibilities of electrical recording to replace the speaking tubes used in dictation machines and many inventors worked along this line. However, it was not until the development of vacuum tube amplifiers that really practical telephone recording became a possibility.

Detectives and Law Enforcement agencies were the first to seize upon recorders as a means of surreptitiously recording telephone conversations. This has created in the minds of many people the idea that there is something surreptitious or immoral about telephone recording, and often tends to obscure the important business applications.

As long distance telephony became more and more of a practical reality, and when overseas telephony became generally used, communications agencies, such as newspapers, started to give thought to transmission of news by telephone. Attempts were made to use skilled stenographers to take shorthand transcripts of such telephone transmissions, but the addition of the stenographer increased the cost of this type of news transmission considerably. In the middle 1930's one of the New York newspapers started a system of getting foreign news by telephone recording on a fairly large scale.

Advantages Of Recording Process

THIS RECORDING process has been limited mostly to overseas news, since the advantages of telephone transmission for that purpose over cable were most marked. Some of the advantages were that:—the transmission was faster—a reporter could call from anyplace where there was a telephone—and the cost was lower than equivalent cable transmission. Such systems have been since set up by other news gathering agencies but have been limited in scope by the fact that there has been confusion in the use of telephone recording devices.

In the field of business, as long-distance telephony became more and more used, the business man found need to make pencil notes of his long distance conversations. As a further expedient he used a secretary listening on an extension phone, to take shorthand notes of important conversations. Telephone companies developed and furnished convenient attachments for this stenographic re-

cording of conversations. Recording of business telephone conversations by voice recording equipment was a natural sequence.

However, to make telephone recording a reality for the business man, many requirements had to be met in the recording equipment. The recording device had to be simple, foolproof, easy to operate in the hands of a business man and reasonably compact. To complete the recording system, there had to be some means of transcribing the voice records into the form of memoranda or other written material, as the occasion demanded. This called for a complete equipment similar to that required for a dictation system, namely, a recorder for the business man, and a transcribing machine at the desk of the secretary. However, the acoustic type of dictation recorder can not satisfactorily record telephone conversations since the sound level of the telephone receiver is not sufficient to actuate the recording stylus of the acoustic machine. Therefore, practical telephone recording for business use had to await the development of practical electronic recording equipment for this type of service.

The apparatus shown under the desk in the above picture is Automatic Electric's Recorder Connecting Box, for use with any standard type of electronic recorder for telephone conversations. The box, which is physically wired into the telephone circuit, contains control facilities, and electronic tubes for providing an automatic warning tone, and is connected to the telephone and recorder by flexible cords.

War Increased Need For Recorders

JUST BEFORE the war, electronic disc recorders were introduced to the dictation field and these provided many advantages over the earlier acoustic type of dictation recorders, particularly in the field of telephone recording. When the war started, an immediate need for telephone recorders appeared. Military people had used such recorders in a limited way before the war and it had been an accepted practice in some military branches to make recorded notes of telephone conversations by competent shorthand operators. Naturally, the scarcity of competent shorthand operators led to the need for mechanization in this field, so the military people required telephone recorders.

War contractors were quick to seize upon the idea and to recognize the value of recorded specifications, contracts, and materials which could be transmitted and made a matter of record, before the receipt of the written confirmation. This provided a great help in accelerating the war effort. Despite the fact that the recorder manufacturers were greatly limited during the war by WPB regulations, telephone recording grew rapidly because, with the advent of low cost machines that were convenient and practical to use, the business man was quick to seize upon this means of improving the efficiency of his operation.

Due to the regulations of telephone companies in regard to "foreign attachments", telephone recording was greatly retarded by the reluctance of many business men to have connected to their telephone any device which did not have the complete approval of the telephone company. However, as the local telephone companies realized the usefulness of telephone recording and the fact that these recorders could be connected without in any way impairing the efficiency of the transmission or causing any service difficulties, unofficial acceptance of telephone recorders appears to have been the general rule throughout the country. Despite the fact that there has been little or no advertising of telephone recording and little stress on the sale of telephone recorders, their use has grown rapidly. This has occurred in spite of the fact that there has been considerable confusion about the legal features of telephone recording and many business men have been loathe to do anything that in any way might be construed to be illegal.

AS A RECOGNITION of the need for regularization in this field and the business need for telephone recording, the FCC instituted its program to examine this field and to issue any regularizing rules which might be required. This program is well under way and a proposed report has been issued by FCC.

This report in essence proposes that telephone companies make available on a regular tariff basis, a connection attachment to which any good voice recorder can be connected by the subscriber. The technical features of this attachment would be such as to preclude the possibility of reflecting any load on the transmission circuits and the attachment would impose an audible warning signal on the line whenever recording was being done.

There are many misconceptions about telephone recording and the practical equipment for this service. One of these centers around the equipment which can be used. Many people believe that almost any recorder can be used. However, telephone recording will be performed by many non-professional people untrained in the use of complicated recording devices. Thus the type of recorder used for the entertainment field is usually not practical. More-

(Please turn to page 61)

Clean, modern Unit De

Automatic Electric Type 4
VOICE-FREQUENCY REPEATER

Here's ***modern*** Voice-Frequency Repeater equipment — built in units economy and complete flexibility. Simple and inexpensive, it provides economical solution of your transmission problems, on lines even as shor thirty miles. And you'll find it practical for your purposes — whether you h ***one*** line or dozens!

Type 47 Voice-Frequency Repeaters are adaptable to any type of circ and method of operation:

Open wire, or cable (loaded or non-loaded)
Two-wire or four-wire lines
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Intermediate or terminal stations
D-c or a-c (20-, 135-, or 1000-cycle) signaling — or any desired combina

Repeaters may be supplied with a power panel, for operation on 115-v 50-60 cycle a-c (total power consumption is only 25 watts). Or, filament rent may be supplied direct from a 24- or 48-volt a-c or d-c source, and p current from 130- or 160-volt battery.

If you operate toll lines on which voice repeaters are needed, you will w to know all about this new equipment. Find out how easy it is to install how very easy to maintain . . . and how it is the most economical way improve toll transmission. Write us . . . or contact your Automatic Elec representative.

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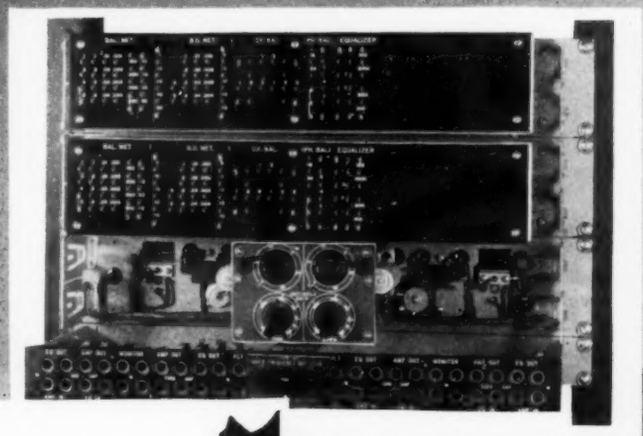
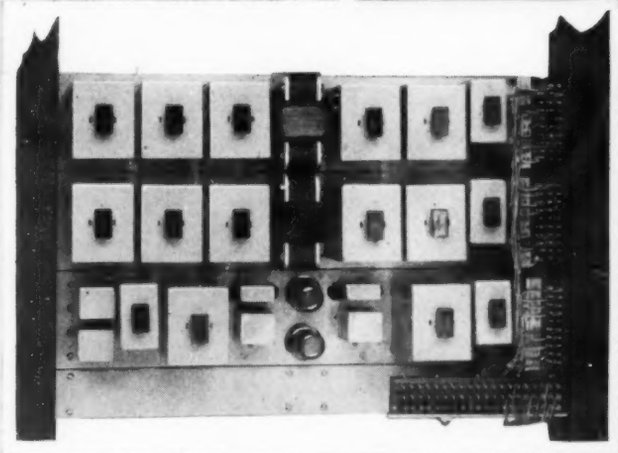
Balance—Adjust—Test It—FROM THE FRONT!

This is a typical assembly of Type 47 Voice-Frequency Repeater equipment. Terminals of the balancing network are brought out to terminal tags, which may be strapped together as required to secure proper balance; "gain" adjustment is provided as described below.

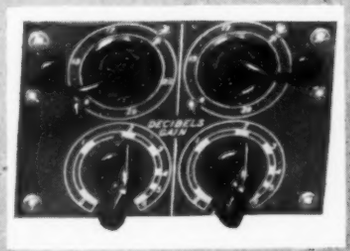
Test jacks are provided for any type of "gain", "singing point", or "monitoring" test; cathode activity and plate voltage tests may also be made. All tests may be performed with the amplifier in the repeater itself, or with a separate amplifier and "pads", as desired.





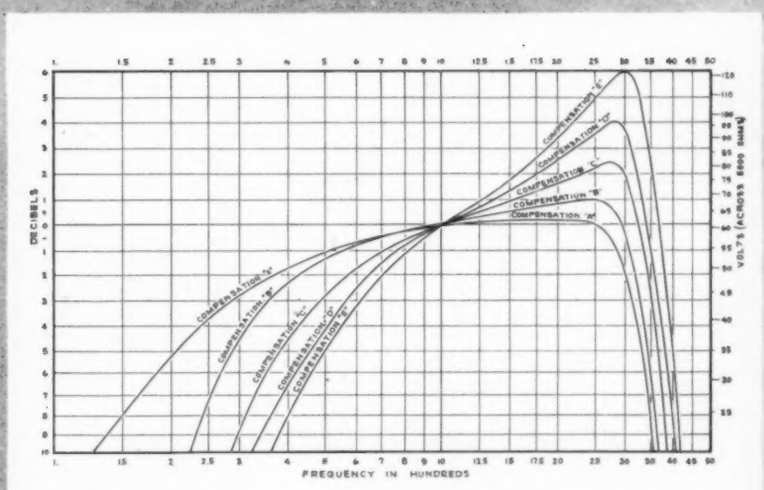
CLEAN, COMPACT ARRANGEMENT

This is a rear view of the Type 47 Voice-Frequency Repeater assembly shown above. All connections to the line and power, and between the unit panels, are made at the small terminal blocks shown at right. Complete assembly requires only 7½" to 15¾", on standard 19" rack.



"DIALED" GAIN ADJUSTMENTS!

Gain adjustment for each amplifier is provided by a pin-ended cord and a potentiometer. When highest practical gain has been secured by adjusting the cord and the potentiometer, the gain obtained may be read directly from the calibrations on these controls.



"TOP" PERFORMANCE!

Stable negative-feed-back amplifiers provide ample gain for any requirements. Adjustable equalizers are provided to compensate for attenuation characteristics of any type of line.

National and State Association NEWS

W. J. Scheidler Named President Indiana Association

The annual convention of the Indiana Telephone Association held at the Claypool Hotel, Indianapolis, May 7-8, lived up to pre-convention announcements and brought those in attendance information that simplified problems of today. Of particular value were two panel discussions covering the subjects "Where is The Dollar Invested?", and "Where Does the Dollar Co?"

The discussion covering capital investments necessary to telephone company operations was presided over by R. V. Achatz, general manager of the Southern Indiana Telephone Company, Aurora. Members of the panel were: Frank J. Baker, general superintedent of the Home Telephone & Telegraph Co., Ft. Wayne; Ray Kieran, chief engineer Indiana Associated Telephone Company, Lafayette, and D. B. Van Fliet, general manager, Garrett (Ind.) Telephone Company.

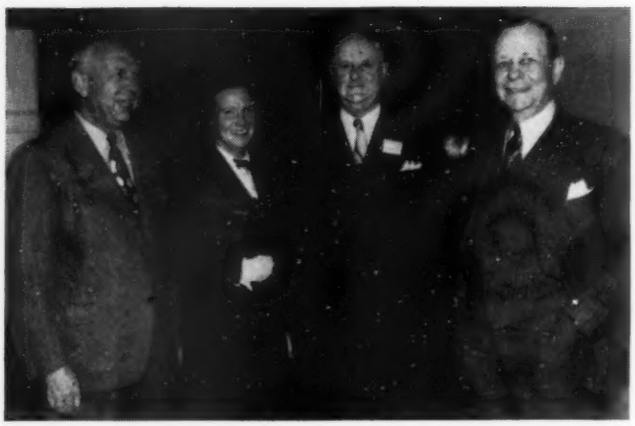
T. D. Dial, general contract agent of the Indiana Bell Telephone Company, Indianapolis, was moderator of the second day's panel discussion covering costs of telephone company operations. Other members of the panel were: J. A. Harbaugh, president of the Sullivan (Ind.) Telephone Company; R. F. Lucier, president of the United Telephone Company, Inc., Warsaw, and Emmett Swanson, executive vice president of the Home Telephone & Telegraph Company, Ft. Wayne.

Directors elected were: R. V. Achatz, Aurora; C. D. Ehinger, Decatur; Louis F. Sheperd, Lafayette; W. J. Scheidler, Greensburg, and LaMar S. Stoops, Nappanee.

The terms of directors elected will expire in 1950. R. E. Brookbank of Pendleton was also elected to fill the unexpired term of E. M. Blakeslee, resigned.

The officers elected were: president, Mr. Scheidler; first vice-president, Mr. Stoops; second vice-president, C. E. McCormick, Terre Haute, and secretary-treasurer, W. H. Beck, Indianapolis.

USITA president R. A. Lumpkin, Mattoon, Illinois, discussed "Industry Affairs" at the noon luncheon on May 7, and stressed the importance of recently enacted laws that will eliminate strikes in public utilities.



This group paused for the camera at recent Indiana convention. Left to right: Mr. and Mrs. Barnhart, Raymond Burfeind and Frank Bohn.

Mr. Lumpkin stated that, "Indiana's recently enacted law which prevents strikes in public utilities will stand to the everlasting credit of the lawmakers of this state."

He declared that the new law is not "anti-anything" and stated "It is the kind of legislation that I call pro-public."

Speaking plainly on the labor situation incident to the national strike of telephone workers, Mr. Lumpkin asserted:

W. H. Scheidler, new Indiana Telephone Association president, and R. A. Lumpkin, USITA president.

"Termination of our first nation-wide strike of telephone employes can not remove permanently the threat of labor disturbance for the industry as a whole.

We may wish it could, but we can not escape the conclusion that permanent legislation, Federal or state, or a combination of both may be ultimately necessary to eliminate the recurrent threat of strikes in our public utility enterprises—strikes which fly in the face of public interest, defy public welfare and imperil public health and safety—strikes which may cripple not only industry and government but even the personal affairs of a whole country—strikes whereby the public is made a whipping boy, impotent in a squabble between management and unions, a controversy in which it has no say or influence or right. Most of us agree that this is a stupidity that transcends tolerance.

"The course of events in at least two states bears witness to the fact that effective legislation can be drafted and enacted. We are not implying that compulsory arbitration either affords a sound solution of this problem or that it even follows as a necessary corollary to the proposition that a public utility, especially one existing under government supervision as a recognized monopoly, has no right to suspend operations either by the decision of its management or its workers. It does follow, however, that when a public is sufficiently aroused, it demands and gets the kind of legislation that is needed for its protection. That

was the result of a calamitous strike of private power company employes in Virginia last year."

Indiana Survey

THE REPORT of secretary-treasurer W. H. Beck, Indianapolis, at the Thursday morning session revealed petitions for rate revisions involving 301 exchanges have been placed before the Indiana Public Service Commission and orders granting those requests have been issued for 70 exchanges.

Mr. Beck stated that at the 1946 convention "it was decided by motion to survey by counties the telephone situation of the state with the thought that the information secured would be helpful in both the extension and improvement of service."

"About mid-summer of last year," he said, "the first survey forms asking for data regarding every exchange in the state were distributed. With few exceptions these forms were returned promptly and tabulation of the data was begun. In addition to providing our office with correct company names, exchange locations and type of company ownership, we secured valuable data as to size of each exchange area, the number of establishments (potential telephone locations) in each rural exchange area, the number of installation orders being held for want of material and equipment, the number of urban and rural telephones in service—both company owned, subscriber owned and switched—the maximum number of subscribers per rural party line, free service line data and information as to type and age of central office equipment.

"The first tabulation of the data listed the major facts about each state exchange. It was then decided to consolidate the information on a county basis and combine with some of the figures from our sheets information furnished by the Public Service Commission relative to service complaints filed with the commission by telephone subscribers in each individual county."

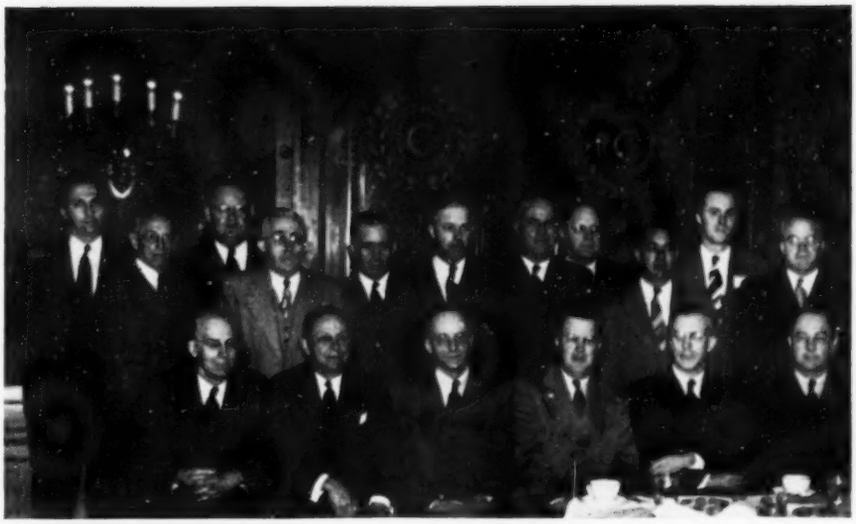
Mr. Beck stated that data developed for each county has disclosed that there are some sections of the state—while not entirely undeveloped—which are in need of further developments, especially in the rural areas. Other sections are in need of, and desire, modernized service as is evidenced by a high county complaint rating. As a future part of the survey project maps will be prepared showing relative telephone development by counties and comparative county complaint ratings.

W. J. Scheidler, general manager of the Public Telephone Corporation, Greensburg, was the final speaker at the general session on Thursday. In his discussion of "Where Does The Dollar Come From?", he explained that the money can be raised by issuing or increasing common stock, preferred stock, mortgage bonds, notes, etc.

"However," he said, "local service rates and toll service rates must be sufficient to bring in enough revenue to take care of interest on these bonds and notes, dividends on common and preferred stock and in addition must provide ample funds to take care of maintenance, depreciation, operating expenses, and do not overlook taxes which are constantly increasing and as you know, comprise a major item of operating expenses. Unless we are able to work out a rate schedule of this kind, we will find it impossible to attract people who have capital to invest in our companies, and which we must have if we are to operate progressively."

For traffic people a separate and special program was held on May 7. It included a morning of discussions of today's local and long distance traffic problems and an afternoon of entertainment and sightseeing at the Indiana Bell's main building.

The conference was conducted by Miss Margaret Shea, Indianapolis, assistant toll practice supervisor, Indiana Bell Telephone Co.



Top photo, members of the Indiana Telephone Association's board of directors.

Bottom photo, (left to right): LaMar Stoops, Emmet Swanson, R. A. Lumpkin, John Harbaugh, W. H. Beck, T. D. Dial, Ralph Lucier, and Louis Shepherd.

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Pennsylvania Association Holds 45th Convention

The Pennsylvania Independent Telephone Association held its 45th annual convention at the Abraham Lincoln Hotel, Reading, May 15-16, and presented to the large audience a program which included Lester R. Thurston, association president and president of the United Telephone Company of Pennsylvania, Harrisburg; A. C. Herbert, executive vice president of the Pennsylvania association; Philip C. Staples, president of the Bell Telephone Company of Pennsylvania; John Siggins, Jr., chairman of the Pennsylvania Public Utility Commission; Honorable Walter H. Judd, Congressman from Minnesota, and Clyde S. Bailey,

executive vice president of the United States Independent Telephone Association.

Directors were reelected as follows: C. E. Eaby, R. W. Kintzer, G. B. Rudy, Jr., J. K. Stoltzfus, L. R. Thurston, A. O. Black, Ames H. Brown, B. H. Cravens, H. M. Engh, A. M. Gibson, and John H. Horn.

Officers elected were: Mr. Gibson, president; Mr. Stoltzfus, 1st vice president; Mr. Cravens, 2nd vice president; Mr. Rudy, treasurer; A. C. Herbert, executive vice president, and M. Ethel Cunningham, secretary.

President Thurston, in his annual address at the first general session on May 15, stated that the association directors had decided to recommend a change in the time that the group's president takes office from January to the close of the annual convention. This procedure will arrange the term of office so that each president in reporting to the membership will have a full year's tenure in office rather than four months as has been the case in the past. Such procedure will also restore the arrangement whereby the convention will be held in the district where the president is located.

The report of executive vice president Herbert reviewed association activities and the progress and activity of the Independent telephone companies of Pennsylvania in their efforts to provide more and better service.

Mr. Staples, as the first speaker at the Thursday afternoon session, described the competition of the early days and discussed the recent strike of members of the National Federation of Telephone Workers. Mr. Staples said that the main objective of the strike had been national bargaining. He recommended that to combat the possibility of future strikes, employers should attempt to educate their personnel as to their job, their responsibility, and the thought that the company will treat them fairly.

The final speaker at the first day's session was John Siggins, Jr., chairman of the Pennsylvania Public Utility Commissions who described in detail the five commission departments and gave detailed descriptions of the duties and functions of each department. He advised telephone company managers of the value of keeping accurate records so that a real picture of their entire operations could be presented whenever necessary.

The business sessions on Friday, May 16, were devoted to addresses by Honorable Walter H. Judd, congressman from Minnesota, and Clyde S. Bailey, executive vice president of the United States Independent Telephone Association.

Have You Had This Trouble?

Dear Mr. Smith:

I am passing this information on to you not so much in the hope that you can help us directly but with the thought that other Independent telephone companies are having the same trouble we are. Perhaps through some common presentation of our problems we can alleviate the situation.

Some time ago I bid on a reel of 600 pair cable which was listed in the War Assets Administration C-9-59. I sent in our offer to purchase immediately upon our receiving the list and our application was dated the 4th of April. The end of the bidding was scheduled for the 21st of April. On Monday, May 12th, I received a notice from the War Assets Administration that our offer to purchase had been rejected for the reason that the property was withdrawn by the owning agency.

The first question that came to my mind was who was the owning agency? Was it the manufacturer of the cable or the War Assets Administration and if it was the latter why should they withdraw an item that they had originally offered for sale? Why did they have the right to withdraw the item?

This is the second time that we have bid on cable and on both cases we have been turned down and I am just beginning to wonder if an Independent telephone company has any chance whatsoever of securing any material through the War Assets Administration.

If some manufacturer can withdraw an item from the sale to sell to any other group that it wishes to sell to, the whole setup of this administration is a complete farce and certainly of no help to the companies who are honestly seeking to bid and receive a fair share of the equipment offered for sale.

I have noticed other discrepancies in the War Assets Administration, namely that on the same list C-9-59 they offered for sale the latest type Automatic Electric handsets at the prevailing price the manufacturers now sell the same instruments for. If this was war surplus equipment which it undoubtedly was, you know just as well as I do, that it was bought at the price in effect during the war which was about 60% of the present day price for the same instruments. Something is certainly very peculiar in any such mark-up of prices by a government agency.

I would be very interested to know if other Independent telephone companies are having the same trouble in securing surplus equipment as we are and I would be more than interested in knowing where the vast majority of equipment catalogued by the War Assets Administration is going to. I sincerely hope that you will find time in the near future to give me what information you have on this problem.

Yours very truly,

Mankato Citizens Telephone Company

P. M. Ferguson Jr.
Assistant Manager & Engineer

We have published Mr. Ferguson's letter in the hope that other telephone companies will tell us their experiences with War Assets Administration. Do Independent telephone companies have trouble securing material through WAA? —Editor.

At the final session association officers presented its staff consultants, John C. Kelley, attorney, Hull, Leiby & Metzger, Harrisburg, and L. G. Lichliter, labor relations consultant, Harrisburg.

◇

Wisconsin State Association Holds Two-Day Meeting

Members of the Wisconsin State Telephone Association held their annual convention at the Park Hotel, Madison, May 21-22 and obtained much value from the excellent program that had been carefully planned by association officers.

Directors reelected to office were: J. J. Kuehn, Rhinelander; Walter Dakin, Madison; L. M. Lampkins, Manawa. John S. Allen was elected to the board to replace Lon Jester. Officers reelected were: Mr. Dakin, president; A. H. Bowden, vice president; Mr. Lampkins, secretary; W. E. Lawton, treasurer, and J. E. Byrne, recording secretary.

In his annual address President Dakin, at the first general session on May 21, reported that 54 new members had been enrolled, and made the following recommendations:

(1) Formation of an employment

(*Please turn to page 66*)

A Message to Telephone Companies About Telephone Recording

THE Federal Communications Commission, in its final report, has stated that provision for telephone recording shall be made in regular tariffs to be filed by the telephone companies. The final order is to be based on the results of an engineering conference which was held in Washington April 29. This means, of course, that when the final order is issued the telephone companies will furnish recorder connection units to which voice recorders will be connected by recorder companies. The connection unit will automatically emit an audible signal notifying all parties that the conversation is being recorded.

Ever since the introduction of SoundScriber in 1940, our engineers have been in contact with telephone engineers. Moreover, during the war, because of their unusual clarity and their peculiar suitability of operation, thousands of SoundScriber electronic dictation machines were used as telephone recorders.

We believe that we understand and have thought through the problems which telephone recording may present to the telephone companies, and, in view of our experience in this field, SoundScriber pledges to the telephone companies:

1. That we and our 180 sales and service points throughout the country will fully coöperate and at all times be ready to work with telephone personnel in the establishment of this addition to telephone service for American business.

2. That we will continue to produce—as we have in the past—the best-performing, the most rugged and service-free machine which your subscribers can obtain for telephone recording. Our simplicity of structure—fully covered by patents—assures your subscribers dependability on a par with your own equipment.

3. As advances are made in both the communication and recording field, you may depend upon SoundScriber engineers to keep SoundScriber in the lead as the foremost manufacturer of electronic dictation and telephone recording machines.

4. We will do our share as requested by FCC in educating the public to recognize the recording signal.

5. We will coöperate in any practical manner with telephone companies as to the installation of connecting units in all places where telephone recorders are already in use.

We hope that all telephone personnel will feel free to contact our factory or our local distribution points for whatever information or assistance we can possibly give.

The SoundScriber Corporation

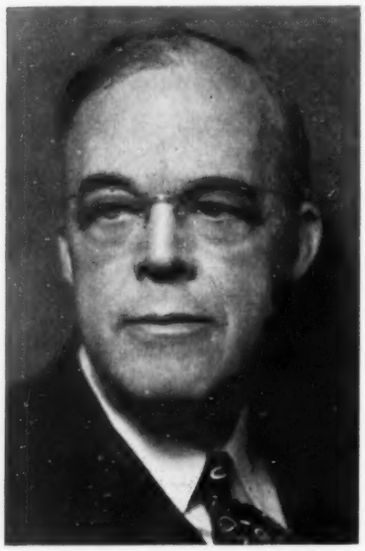
Lincoln Thompson

PRESIDENT

TELE-VIEWS

Officers and directors of Wisconsin State Telephone Association. Seated (left to right): J. E. Byrne, W. E. Lawton, Walter Dakin, A. H. Bowden, and J. S. Allen. Standing (left to right): L. M. Lamkins, E. B. Samp, S. B. Lockwood, J. F. Benjamin, W. C. Bolenius, G. B. Rogers and B. H. Piepmeier.

Geo. Ernst presents Gold telephone to President James H. Kellogg in commemoration of Kellogg Co.'s 50th anniversary.



Ralph L. Corey, has been appointed vice president of Great American Industries, 230 Park Ave., New York City.

Registration desk at recent Wisconsin Convention. Standing (l. to r.) B. H. Piepmeier, T. C. Thompson, E. B. Samp. Seated (l. to r.) J. E. Byrne, F. H. Runkel, K. J. Jackson, Helen Miller.

Richard Cole, former div'n. mgr. of Illinois Tel. Co., Streator, has joined Ohio Consolidated Tel. Co., Portsmouth, as general superintendent.

Guest table at May 21 banquet of Badger State Chapter, Independent Telephone Pioneer Association.

a man's a

giant

with a

BARCO

Barco is the accepted tool on thousands of hurry-up jobs all over the world. Foremen know that a worker gets powerful muscles of steel when you team him with a Barco Portable Gasoline Hammer. He works harder and faster with this tireless tool. The toughest going—even in hard-to-reach spots—becomes easy. Eleven special attachments make a Barco useful on dozens of *different* jobs.

BREAKING • DRILLING • DRIVING • TAMPING

BARCO

PORTABLE GASOLINE HAMMERS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

BARCO MANUFACTURING CO., NOT INC., 1835 WINNEMAC AVENUE, CHICAGO 40, ILL.
IN CANADA: THE HOLDEN CO., LTD., MONTREAL, CANADA

TAI Survey Studied by USITA Advertising Committee

RESULTS OF THE recent Telephone Advertising Institute survey, plans for direct mail and rural programs, and a review of general copy trends were principal items taken up at the meeting of the USITA Advertising Committee April 12 and 13 in Chicago.

The Institute, which provides advertising material for more than 1,000 Independent exchanges, operates with the assistance and counsel of the Advertising Committee.

The Survey Report was considered in some detail, and the committee made recommendations regarding general and individual suggestions. For example, more automatic equipment is to be illustrated in Institute material; a more positive approach will be given on general copy, and companies will be advised more fully of ways to utilize Institute illustrations with localized copy.

A program whereby direct mail is substituted for newspaper advertising mats will be offered to the small Independent telephone companies which cannot use certain portions of the present service. If a minimum of 100 companies can be obtained, the program will be inaugurated this fall.

A tentative outline for a 12-month rural advertising program was considered and will be submitted to the USITA Rural Telephone Service Committee for further suggestions.

During the discussion of general copy trends, it was recommended that certain specific advertisements be prepared as follows:

Explanation of how the telephone industry went to war more than almost any other industry, which is one reason why it takes so long to catch up on accumulated demand.

Unprecedented demand for service; most companies have filled a large number of held orders, but new orders continue to come in.

Descriptions of individual shortages, such as copper wire and lead, and how they affect installation delays.

Breakdown of the telephone dollar to show how revenue is spent (if practical on a general basis).

Lack of skilled manpower, and fact that time is needed to train good telephone employees.

Continued stress on the lack of central office equipment will be given, and ads will emphasize the increased calling rate as a factor in inadequate service.

A series of advertisements may be prepared soon on the "economics of the telephone business," and another series is planned later on covering explanations of telephone terminology.

The current bill insert price policy (one price for all, regardless of quantity ordered) was discussed. Since the experiment has not been successful and has resulted in loss, the Committee expressed the opinion that the Institute should revert to "scaled" prices.

The USITA Tax Committee will be asked again for recommendations regarding advertisements explaining excise taxes. Several subscribers have expressed a need for such material.

One Committee member reported good results from using reproductions of newspaper ads as counter cards, simultaneous with the running of the ads in the newspapers. The Institute will investigate the cost of providing such additional service.

Several individual subscriber requests were discussed and will be dealt with individually. Others, as previously mentioned, can and will be applied to the service generally.

R. E. Rudolph of the Ellensburg (Wash.) Telephone Company attended a portion of the meeting in order to present his company's special advertising problems, and determine what might be done by the Institute. Mr. Rudolph will outline his needs more thoroughly from time to time by letter and will be given every possible individual aid by the Institute.

Much discussion was held on the utilization of Institute illustrations with localized advertising copy. The Committee recommended a series of articles in "Telephone Advertising Digest", illustrating the possibilities.

It was also agreed that there is still a tremendous sales job to be done in the industry—convincing Independent companies of the need for a sustained, organized advertising program. The Digest will also be used to emphasize this need, and to give present subscribers as many helpful advertising ideas as possible.

A report of Committee activities since last October was prepared during the meeting and presented to the USITA Board of Directors.

(Please turn to page 54)

STROMBERG-

cook type 7

high-potential lightning arrester

Outdoor pole type arrester provides lightning protection and atmospheric static drain for five pairs of open-wire circuits, or for drop wires and cables leading to unprotected terminals.

Equipped with:

1. Single piece molded Bakelite insulation and fanning strip for strength and high resistance. Fanning strip is closed with a thin film of Bakelite until drops are run.
2. Non-corrosive metal hood, Everdur studs and galvanized mounting bracket for long service life.
3. Phosphor-bronze spring clips to accommodate Cook Tru-Gap nongrounding lightning dischargers.

STROMBERG-

BRANCH OFFICES: CHICAGO 6

RG-CARLSON Recommends

habirshaw no. 17 bronze drop wire

NO. 17 BRONZE PARALLEL NEOPRENE SHEATHED DROP WIRE

NO. 17 BRONZE TWISTED PAIR NEOPRENE SHEATHED DROP WIRE

Stromberg-Carlson offers these two new Drop Wires with five important features:

1. High Dielectric Strength.
2. Flame-Resistant—Sheath will not conduct flame.
3. Weather-Resistant—No exterior braids to weather and festoon; impervious to effects of moisture, acids, oils, and factory fumes.
4. Mechanically Strong.
5. Time-Tested.

DISTRIBUTED EXCLUSIVELY BY STROMBERG-CARLSON

sturgis standard no. 435-a

minimizes "chair fatigue"

Sturgis Chairs *take over* sitting strain! Maintaining best posture for operating with least muscular exertion, operators can recuperate quicker at rest periods from *actual* operational fatigues, minus—chair fatigue!

Height and depth *inter*-adjustments between Sturgis ample Saddle Seat (16½" wide, 14½" deep), and ample Plaited Backrest (8" high, 13" wide), are limitless and offer the equivalent of a *made-to-measure* chair to every operator.

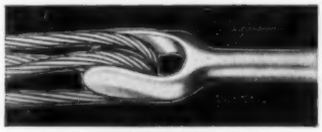
Heavy welded steel tubing (1" O.D. for base, ¾" O.D. for footrest), makes Sturgis frames indestructible. Their hair-filled, genuine leather upholstery wears everlastingly.

Chair Height Specifications

Seat Height Adjustment	Footrest Height from Floor	Seat Height Adjustment	Footrest Height from Floor
18" to 22"	5"	24" to 28"	10"
20" to 24"	6"	26" to 30"	12"
22" to 26"	8"	28" to 32"	13"

DISTRIBUTED EXCLUSIVELY BY **STROMBERG-CARLSON**

THIMBLEYE



TWINEYE

TRIPLEYE

better guy installations with improved

thimbleye

Thimbleye, Twineye and Tripleye Anchor Rods and Guy Fixtures offer more protection to guy strands.

The new improved eye is full-rounded to prevent kinking at any angle, or flattening under tension. Injury to galvanizing, with consequent rusting, is eliminated and slack pulling is made easy since guy strand passes through the eye smoothly without kinking, bending, or binding.

The improved eye is drop-forged on the rod as a perfectly shaped thimble and the sidewalls and groove of the eye extend completely around the head of the rod. Grooves are deeper and give better support, conforming in depth and width to the largest cable size used with each rod or guy fixture.

STROMBERG Telephone CARLSON

The Institute was represented by Elinor Bishop, Nathan E. Jacobs, and Philip Rouda, of Bozell & Jacobs, Inc.

Next meeting of the Committee is scheduled for July 10 and 11, probably in Chicago.

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Interstate Telephone Co. Announces Expansion Program

A $5,000,000 development program to expand service in the growing Pacific Northwest has been announced by C. E. Johnston, president and general manager of Interstate Telephone Company, Spokane, Wash.

Plans for improvements, extending over the next five years, were disclosed after rate increases were granted recently for Interstate service in Eastern Washington, Northern Idaho and Western Montana. General pay increases were made by the company simultaneous with the higher wage scale.

Interstate's expansion parallels development of the vast Columbia Basin Reclamation Project and other proposed federal undertakings in the area, Mr. Johnston said. Industrial and rural growth over the entire territory has brought demands for telephone service, he commented, that are far beyond present capacities of plant and traffic departments.

Cut-over of the Priest River, Idaho, exchange to automatic operation in late February was the first major improvement made by the company in its program for better service. Interstate now has automatic service at twelve of its 48 exchanges.

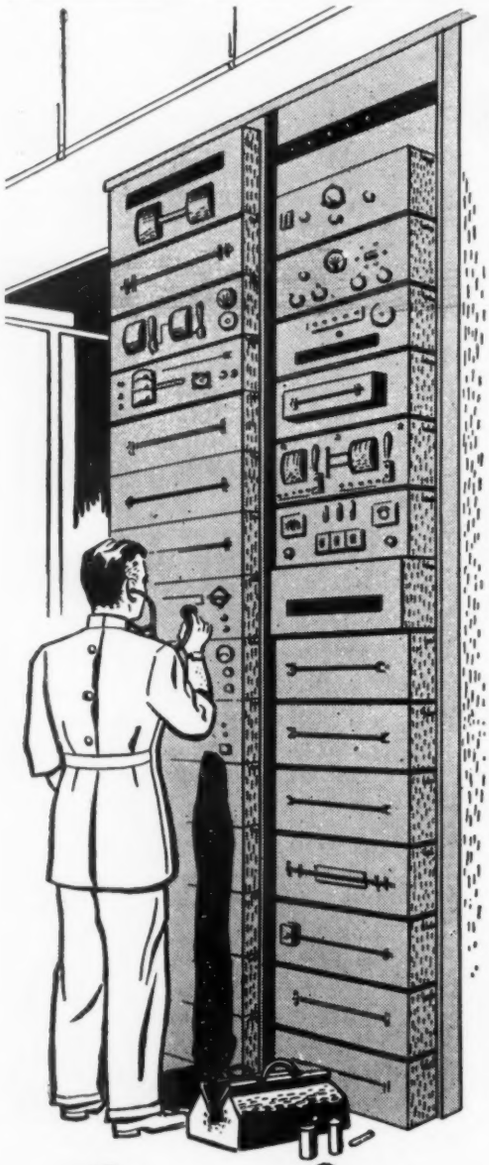
◆

I. R. E. Holds Successful National Convention

The intense interest in radio and electronics is shown by the enormous attendance at the recent Convention of the Institute of Radio Engineers held in New York City. Twelve thousand engineers and technicians showed up to listen to 121 papers presented at 24 technical sessions during the 4-day convention. Elaborate exhibits on the main floor of the Grand Circle Palace were evidence of the activity being shown by manufacturers in converting wartime developments to peacetime use. Telephone engineers viewing the many intricate and remarkable devices shown and listening to elaborate papers on complicated subjects could not help but speculate on the part some of this equipment and procedures may play in future telephone operations.

Among the convention subjects of interest to telephone people was the possibility of reflecting microwave radio signals from the moon as a means of communication between points widely separated on the Earth's surface. Conceded as feasible from a technical standpoint, communication links via the moon would tend to relieve existing congestion on the lower frequencies. Possibilities of this unique method of getting new channels for long distance radio-telephone signals are to be investigated with the Signal Corps "radio signals to the moon" experiments of last year as a background.

Magnetic wire recording devices were discussed and demonstrated and indicated real improvement in this relatively old device. A large amount of microwave equipment and components and microwave applications were discussed. Application of microwave techniques to commercial communication needs is still moving slowly in spite of earlier predictions of the wide use of war developed microwave techniques.



Would You Call Your M.D.

to Repair the Transmission Unit?

Of course not, for your company depends upon trained, technical skill to insure maximum operating efficiency.

Increased advertising revenues, too, must be based on proved methods that combine immediate volume with a sound public relations policy to insure future sales.

Only specialists can achieve these results . . . and the Loomis Company is an organization of specialists that is increasing advertising revenues for telephone companies all over America.

Call or write Loomis today for a discussion of your directory sales possibilities. Wesley H. Loomis, III, President, and Roland T. Beard, Vice-President, cordially invite your inquiry.

Loomis ADVERTISING COMPANY

502 Gettle Bldg., Ft. Wayne 2, Ind.
506 Olive St., St. Louis 1, Mo. 20 West 9th St. Bldg., Kansas City 6, Mo.
6908 Market St., Upper Darby (Phila.) Pa.; Omaha Nat'l Bank Bldg., Omaha 2, Neb.

Special spinning equipment lashes cable to supporting strand.

★

NEW PRODUCTS SHOWCASE

★

STAINLESS STEEL SPINNING WIRE

Stainless steel spinning wire for telephone cable suspension in highly corrosive atmospheres has been introduced by a midwestern manufacturer of cable spinning equipment. It is said to assure substantial savings—lasting from three to five times longer than heavily coated wire formerly used where corrosive conditions are severe.

Besides the savings gained from stainless wire, manufacturers say installation costs are cut 20% by the lashed method of telephone cable suspension. In this method of spinning, the telephone cable is tightly lashed to the supporting strand by means of helically wound wire. This may be accomplished by hand, although special spinning equipment is far more efficient. Another advantage is that cable life is lengthened by reducing friction at points of support. There is less danger of damage due to expansion and contraction because the wire holds the cable firmly in place.

Stainless steel is said to be ideal for corrosive atmospheres such as railroad crossings and seaboard locations where heavily coated wire often fails within a year or less. Although initial costs are higher than for other wire, stainless steel is more economical because it lasts many times longer. Maintenance costs are much less, too.

ARMCO stainless steel spinning wire.

According to Engineer D. J. Neale, of the Cable Spinning Equipment Company, Topeka, Kansas ARMCO Stainless Steel Type 316 has given excellent results on cable suspensions in highly corrosive atmospheres. This grade is especially noted for its high resistance to corrosive conditions.

◆

Hydrauger Corp. Introduces New Earth Boring Tool

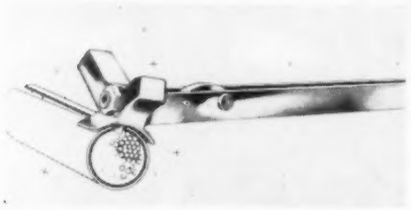
A new horizontal earth-boring tool, light enough to be operated by one man, has been announced by the Hydrauger Corporation, Ltd. of San Francisco. Expressly developed for running in pipe leads, it is reported to be consistently straight-boring for underground up to 50 feet. Power is provided by a 3.2 horsepower motor operated by 90 pounds of air pressure. The pilot bit hole of 2-inch diameter can be opened up by reaming to 3½ and 4½ inches. For added handling ease, boring bar sections are only 2 feet in length and weigh but 5 pounds each. The new development, Model LHH-2, joins a family of larger Hydraugers that have been used by utilities for years, particularly for installing pipe under pavement, landscape, buildings, etc. The manufacturer offers further information to persons writing the company at 116 New Montgomery St., San Francisco.

One man can operate this new Hydrauger Horizontal earth-boring tool, Model LHH-2.

Sheath Slitter Prevents Damage to Cable Liner

A cable slitter that will slit the lead sheath of any cable in general use without danger of cutting into the thin liner, is the latest product now being made by Buckingham Manufacturing Co., Inc., Binghamton, New York.

An adjustable slitting blade, guided by a radial guard, is held securely in place by an Allen set screw which is loosened to make adjustments in cutting



New-type cable slitter prevents damage to cable liner.

depth, or to reverse the blade. The reversible feature of this blade lends the tool to either right-or left-hand usage. This tool cuts along the length of the lead sheath by means of hammer blows applied to either forged lug of the double head, in the direction of the bits cutting edge.

A spreading dog is built into the tool handle and has two anchor holes for adjusting it to varying cable diameters, thus providing an ideal leverage tool for spreading the slit sheath.

Parts are heat treated for hardness and toughness to withstand the hard usage imposed on them. Spare blade and wrench are supplied. Worn or damaged parts are interchangeable with available new parts.

◆

Homelite Introduces One-Man Electric Chain Saw

A new one-man, high-cycle electric chain saw is announced by the Homelite Corporation, Port Chester, New York. Weighing only 27 pounds, complete, this new chain saw is easily handled by one man, for felling, limbing or bucking trees or for accurately cutting timbers up to 20 inches. Operator fatigue is greatly reduced by elimination of weight, vibration, engine-heat and exhaust fumes encountered in direct engine driven saws. Its small size and light weight permit this saw to be used in a tree for limbing—or in other locations inaccessible to bulkier or heavier saws. It may be used for cuts at any angle.

The electric power for the saw is furnished by a Homelite High-Cycle generator driven by an integral gasoline engine—a compact lightweight generator which can be carried to any location. Homelite carryable 180-cycle

Homelite's one-man electric chain saw.

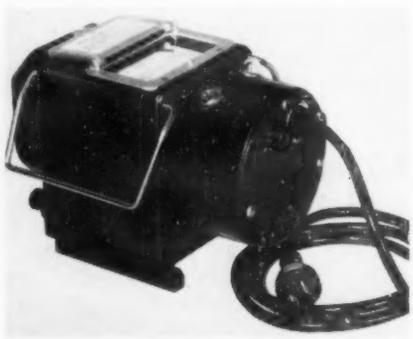
generators are available in two sizes. The Model 24A230/180 has a rated capacity of 2500 watts, and weighs only 129 pounds complete with engine. The Model 25A230/180 has a rated capacity of 5000 watts, and weighs only 171 pounds. The Model 24A230/-180 generator operates one high-cycle chain saw and the Model 25A230/180 generator will operate two. Either generator can be used to operate other types of high-cycle electric tools, such as drills, nut runners or grinders. The generator requires no manual attention during operation; an integral governor automatically controls the engine speed from no load to full load.

◆

Handy Bulletin Available On "Megger" Insulation Tester

For those who need or prefer a "Megger" Insulation Tester that can be plugged in instead of hand cranked, James G. Biddle Co. has developed a rectifier-operated instrument here illustrated. It is ready for operation simply by connecting to 115 volts AC.

This instrument is especially useful where a large number of tests are to be made at one time and also where an individual test is continued for many minutes. The latter includes dielectric absorption tests where careful observations of insulation resistance are made over a period of ten or more minutes.



New - type "Megger" insulation tester can be plugged-in instead of hand cranked.

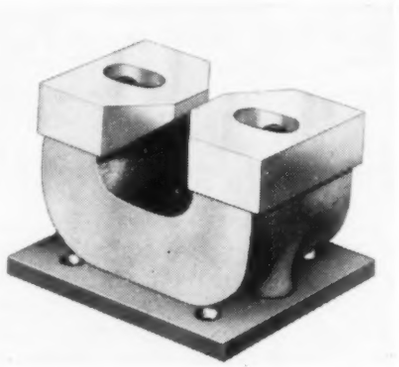
The rectifier-operated "Megger" instrument is essentially a modification of the Biddle Company's "Meg" type insulation tester. The hand generator is replaced by a power pack consisting of a constant-potential, step-up transformer and selenium rectifier giving a constant d-c test voltage. The "Megger" ohmeter covers a wide range and is independent of the applied voltage. Ratings are available up to 2000 megohms and 1000 volts. Described in James G. Biddle Co.'s Preliminary Bulletin 21-46-43

◆

New Series of Permanent Magnet Chargers

A convenient new series of permanent magnet chargers has been placed on the market by Thomas & Skinner Steel Products Company, Indianapolis, Indiana. Literature including specifications and prices is available upon request to the factory.

The new chargers, fabricated from the high external energy product Alnico V alloy, are produced in two sizes,



Permanent magnet charger made by Thomas & Skinner Steel Products Co.

offering a usable magnetizing force up to 3400 oersteds—and variable air gaps from zero to 1¼ inches. They are shipped magnetized.

Complete details and instructions may be had by writing to Thomas & Skinner Steel Products Company, 1092 East 23rd Street, Indianapolis, Indiana.

◆

New Booklet Describes Aluminum Ladders

A new 12-page booklet, "The Story of Aluminum Ladders," has just been published by the Aluminum Ladder Co., Worthington, Pa. Profusely illustrated, the booklet, in addition to giving information about the innovation and development of aluminum ladders, describes a number of the company's products for the fire, marine, dairy, aviation and general industrial fields.

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and tell us
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An Engineering and Construction Company with 47 years of telephone experience.

If they have to shout like this over your lines...

MAYBE YOU OUGHT TO INSTALL USS AMERTEL 135

AMERTEL 135 has much better voice transmission characteristics than the old steel telephone wire—and it has lower electrical resistance, too. So when you replace your present lines, or install new ones, try Amertel.

Not only will your customers hear better, but you will save money on installation costs, for Amertel 135 can be put up in spans *double* the length of the standard BB wire. Some companies report savings as high as 30% of construction costs.

When Amertel is used with PFT Preformed Armor Rods, further protection is offered against breaks. Armor rods dampen vibration effectively . . . protect the wire at the support points . . . reduce outages caused by wind and sleet. Write for complete information about U·S·S Amertel and PFT Armor Rods.

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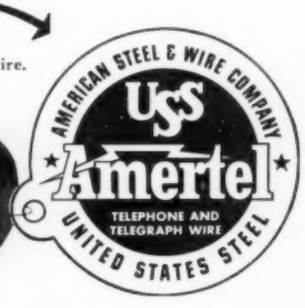
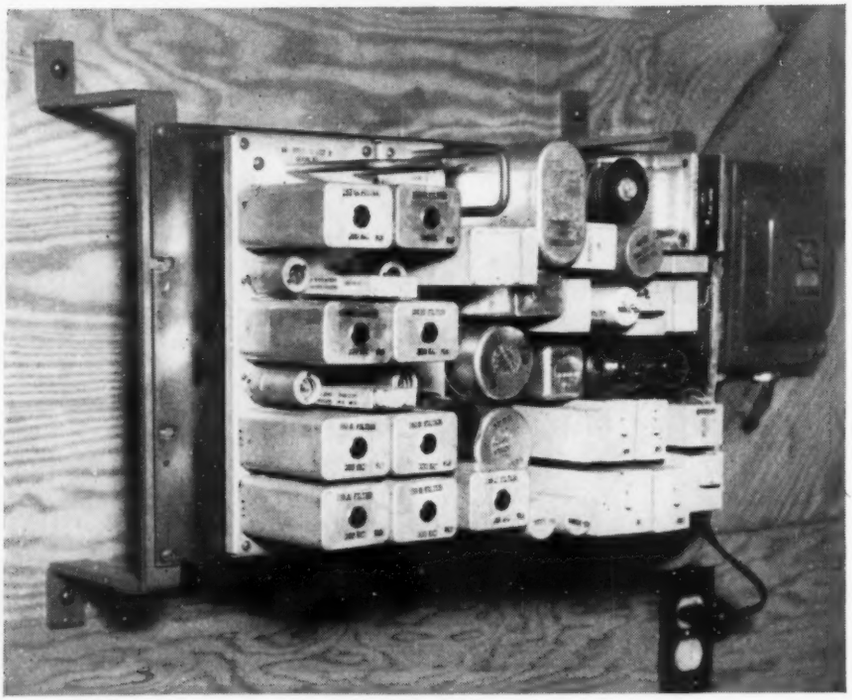
Look for this tag
It is your assurance of highest quality wire.



Rural Service via Power Line Carrier

(Continued from page 32)



Common carrier terminal of M-1 carrier terminal telephone system, Nashville, N.C.

tween the central office and the common terminal consists of 1600′ of 24 Ga. cable and 5228′ of 109 iron wire.

The section of power line used for this installation was a 6900 volt, single phase, multi-grounded, radial feeder. The power line extended for 9 miles beyond the last subscriber. The following equipment was required to adapt the power line for carrier telephone service: 2 Isolating Chokes, 14 Tap Chokes, 7 Coupling Units, 7 Coupling Capacitors.

This equipment was installed by personnel from the Carolina Power & Light Company and required approximately 64 man hours.

Personnel from the Carolina Telephone & Telegraph Company made the telephone equipment installation and required approximately 55 man hours. An additional 12 hours were required to adjust the sets and balance the voice frequency loop into the central office.

A small house was provided for the common terminal instead of using the pole mounted cabinet. This simplified the installation of the common terminal equipment as well as balancing the voice frequency loop.

The Nashville Project is one of seven installations being made throughout the nation by Independent and Bell Telephone Companies and their completion marks the first time that "power line carrier" has been utilized to bring telephone service to rural areas which are beyond the reach of existing telephone lines.

The principal of the power line carrier, however, is not new. In the early spring of 1924 Western Electric engineers installed a telephone communications system over the high voltage power lines of the Alabama Power Company and the Georgia Railway and Power Company. This system featured direct coupling, metallic circuits, and two-way operation. This older form of power line carrier was intended for communications between power plants and substations.

The M1 System, however, had its inception in the general recognition that the establishment of rural power lines constituted, potentially, a contribution to rural telephone service. This was true whether such lines were constructed by private power companies, or through the Rural Electrification Administration or other public means.

Late in 1936, Bell Laboratories un-

STROMBERG-

crapo high-tensile line wire

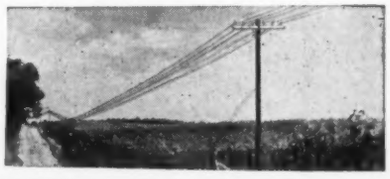
Reduces Over-all Costs

A net saving of 10 to 15 or more pole structures per mile is possible where *Crapo* High-Tensile Telephone Line Wire is used in long-span construction. Fewer pole structures mean substantial savings in time, labor and material, and in maintenance.

Crapo HTL-135 makes possible spans of 350 feet in heavy, 450 feet in medium, and 500 feet in light loading areas. Its practical economy should be considered for new extensions and where old lines are to be replaced.

Crapo HTL-85 (No. 12 B. W. G.) permits spans of 225 feet in heavy, 325 feet in medium, and 375 feet in light loading districts; provides stronger spans on existing pole structures. Both wires possess superior telephonic transmission qualities.

Write for Manual of Engineering Data and Construction Practices for *Crapo* High-Tensile Telephone Line Wire!



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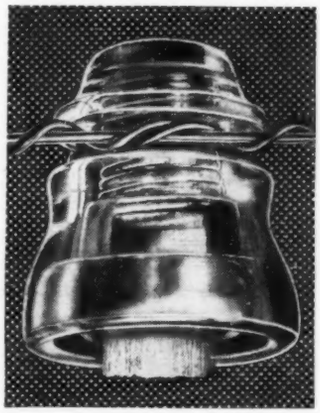
BRANCH OFFICES: CHICAGO

RG-CARLSON Recommends

armstrong's *glass insulators*



STRONGER THAN SUPPORTING PINS!

Both in laboratory tests and in actual use, Armstrong's Glass Insulators have consistently proven stronger under transverse strains than the pins which support them!

This superlative quality is no accident. For more than 24 years, Armstrong's Insulators have embodied the finest in glass-making know-how.

Proof against every extreme of weather, these insulators also discourage malicious breakage. Crystal-clear, they are practically invisible against the sky.

Proof of their quality is the fact that leading communications systems all over the globe specify "Armstrong's" when buying glass insulators.

They conform to—or exceed—A.S.T.M. standards

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Splicing two wires of different sizes can be an uncertain job. But with *Nicopress* Reducing Sleeves you can be sure that the splice is made to stay—every time.

Making a splice with *Nicopress* is a simple matter. Just clean the conductors, slip them in the reducing sleeve, compress the sleeve with the *Nicopress* Tool, and the job is done.

For splices of all kinds, easy to make—hard to break—specify *Nicopress.*

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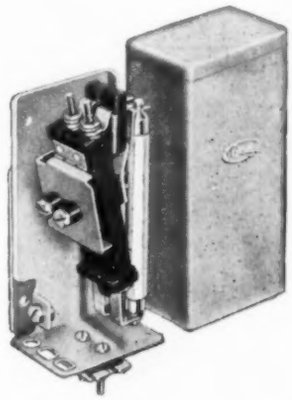
A very rugged Protector, assembled on a bracket of heavy steel—instead of porcelain—to take rough handling and subscriber abuse without danger of breakage. Other outstanding features:



1. Uses a Cook Standard Type H Protector unit with molded bakelite base for high resistance to electrical and physical shocks.
2. Protector unit contains both primary and secondary arresters. The secondary arrester provides a path to ground for lightning should the fuses be blown.
3. Mountings contain heavy studs for connecting drop wires and ground.
4. Equipped with heavy zinc weatherproof hood, and bracket for mounting on post, wall, etc.
5. All structural parts, including hood and bracket, are grounded.

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STROMBERG Telephone CARLSON

dertook a preliminary study of the possibility of applying carrier to rural power lines. In 1938 an active development program was begun. The laboratories conducted theoretical studies, measurements and coupling experiments and projected the first equipment designs. In December of 1939 the Rural Electrification Administration expressed its interest in this project and offered to cooperate in any way possible.

This agreement resulted in series of joint tests in 1940 and 1941 on REA power lines in Maryland and Indiana. The tests yielded invaluable information on transmission characteristics, noise, coupling methods, and line mod-

Carrier terminal house, incoming voice frequency line and 6900 KU power line. Also shown on power pole are isolating choke, coupling capacitor, and common coupling unit.

ifications. The first sets had been tested and their redesign was underway when the urgency of war work halted the project temporarily at the end of 1941.

The project was picked up again in January 1946 with the redesign of equipment in the light of Bell Laboratories' war experience. Development work and field tests have gone on unremittingly.

On the basis of these investigative activities Western Electric has settled on its equipment and has produced the M1 Carrier Telephone System for Rural Service as a contribution to the telephone art. The installation of these systems is being furthered in connection with telephone companies to improve and expand telephone service in rural areas.—**THE END.**

★ In Case of Fire Keep a Cool Head—

Mob Hysteria Is A Killer!

By

UNCLE JOE SAFETY

FIRE UNDER control has contributed more to the progress of civilization and our comfort than possibly any other single factor. On the other hand, uncontrolled fires have been among the greatest causes of misery and destruction.

Since fire has taken a tremendous toll in lives recently and, perhaps most sensationally in hotel fires, and countless telephone men are traveling night and day in performance of their duties, we have compiled a list of suggestions that may at some time in the future save your life.

1. When entering the hotel, look around the lobby. If you see automatic sprinklers, you will know that the danger of fire is greatly reduced. If there are open stairways leading up from the lobby, this is a danger signal as in case of fire originating anywhere in the basement or first floor the stairs serve as flues to spread the fire rapidly throughout the building.

2. In any hotel where you have any doubt as to its fire safety, ask for an outside room not too high above the street—in other words, within reach of fire department ladders.

3. When you get to your room, immediately look around to see how you would get out in case of fire. Find the way to the stairs or fire escapes and make sure that no locked doors or barred windows block your escape.

4. Inquire as to what provisions are made to warn guests in case of fire—is there a hotel fire alarm system, or is the only way to notify guests ringing individual phones or knocking on doors?

★ "Know where you're staying—above all know how to get out in case of emergency."

5. If other possible means of exit appear unsafe, figure out how in case of necessity you could get out your hotel window. If there are balconies or adjoining roofs, see how you could use them.

6. Unless immediate comfort is more important than safety from the relatively remote chance of fire, close both door and transom to the corridor before going to bed. Do not yourself contribute to the fire hazard by smoking in bed.

7. If you are suddenly awakened by a night fire, open the door to the hall very cautiously. If the hall seems safe to use, proceed at once to the exit you have previously selected. Don't stop to pack your luggage; a minute's delay might prove fatal.

8. If, when you open the door, you meet fire or hot smoke, do not try to get out that way but stay in your room. Even an ordinary wooden door, tightly closed, can hold back fire for some time before it burns through. Open your window and wait for the fire department. As long as you keep your door and transom closed, you should be safe in your room for a considerable period of time.

9. When the firemen arrive, follow their instructions. Wait your turn at the ladders; there may be someone else at another window in more immediate danger. If it is a question of jumping to a life net, wait until the firemen are ready to catch you.

You might sorta tuck those nine suggestions away for reference whenever you enter a hotel. After all it's your life—take care of it!

Telephone Recording

(Continued from page 43)

over, the usual type of home recorder will not suffice since it may not meet the requirements of reliability and simplicity demanded from office machines. In any dictation process, the recorder must be easily operated, and there must be a separate transcriber with convenience features for the typist. These conveniences must include a foot or hand control which with one switch instantly starts and stops the record and with another permits quick repetition of words not understood on the first playing.

These same requirements must be met in the telephone recording field. Thus the equipment designed to take care of the dictation process, is the type of equipment which is most suitable for telephone recording. Any equipment which presents transcription difficulties is almost automatically ruled out.

Popular Misconception of Telephone Recording

ANOTHER misconception is that many people think of telephone recording in terms of recording every conversation on some type of automatic recording device located at a switchboard. This type of recording has little practical use in most business operations, since the average business man only wishes to record certain of his calls, and usually these will be limited to long distance calls. While he may, as a matter of habit, record all of his long distance calls, he may actually make use of little of the material of these calls, but what he does select for filing or transcribing is usually of great importance to him. This selected material which the business man wishes to keep will be handled in one of two ways: either the record itself will be filed for future reference or it will be transcribed into typing. As an example in one kind of telephone recording use, it is frequent practice for a salesman or a field representative to call the home office and the telephone conversation will involve things to be done by several members of the home organization.

The several members in question are called together to listen to the recording of the conversation. In

(Please turn to page 64)

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THE WHITNEY BLAKE CO.
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Well Built wires since 1899

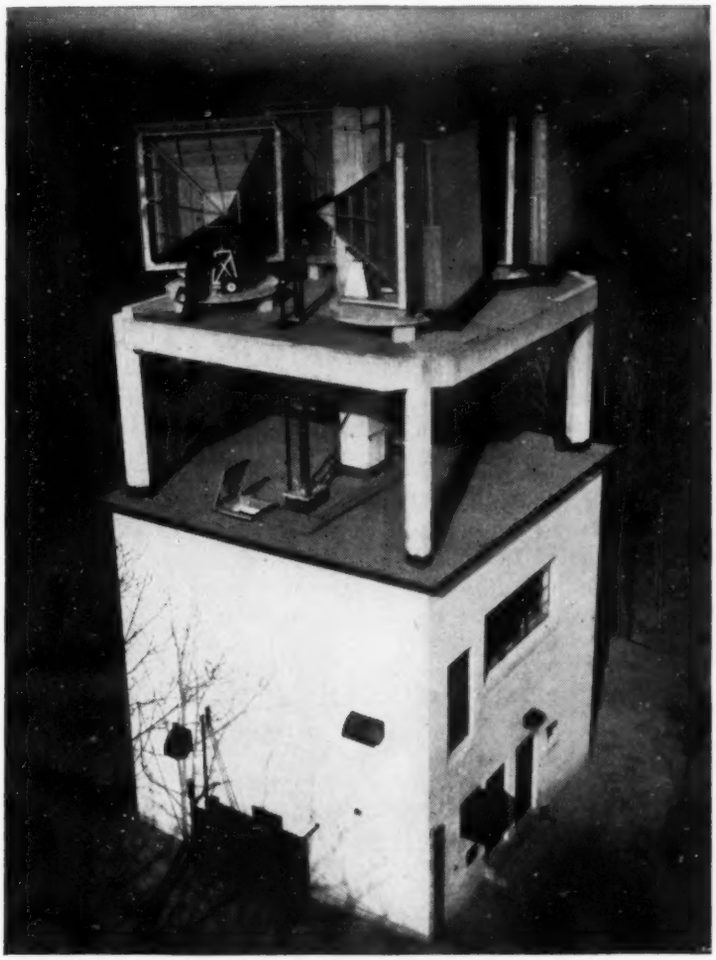
PASSING THE WORD ALONG

Work is progressing on our new experimental radio relay system between New York and Boston. When completed, it will help give us the answers to the part microwave relay systems will play in improving the transmission of Long Distance telephone calls, pictures, radio broadcasts and television programs.

The public is learning about microwave relays in national advertising. The advertisement on the opposite page appears in June. It is a reminder that the telephone industry is always looking for new and better ways to pass the word along.

An Advertisement of the Bell Telephone System

Seven towers on seven hilltops



One of seven relay stations—to test use of radio "microwaves" for Long Distance services

Built by the Bell System, they will provide a new kind of Long Distance communication.

Each hilltop tower is a relay station between New York and Boston* for very short radio waves. These "microwaves" are free from static and most man-made interference. But they shoot off into space instead of following the earth's curve. So they have to be gathered into a beam and aimed at the next tower, about 30 miles away. That's the job of the four big, square, metal lenses on each tower. They focus microwaves very much as a magnifying glass focuses the sun's rays.

These radio relay systems may be used for Long Distance telephone calls and to transmit pictures, radio broadcasts and television programs.

This is another example of the Bell System's effort to provide more and better Long Distance service.

BELL TELEPHONE SYSTEM

**We have applied to the Federal Communications Commission for authority to start a similar link later between New York and Chicago*

this case, typing is unnecessary. However, if it is not convenient or practical to get the group together to listen, the typewritten memorandum of the conversation will go to these people. Consequently, a system that allows for easy filing, and a system that allows for easy playback to a group, has many advantages over a system which is confined only to the matter of making a record and transcribing the results. The requirements for recording equipment call therefore, for not only a convenient medium to use, but convenient medium from which to select the desired material, and a medium which lends itself to easy, simple transcription.

IN THE DICTATION field, the cost of the recording in terms of cost of recording per hour, has always been extremely important, hence, for many years, the only practical machines to use were those employing wax cylinders which could be shaved off and re-used. A permanent record system, in order to have equivalent cost requires that the record itself be cheap and play for a long time. This is accomplished by the use of thin discs or thin sleeves.

The fact that a telephone recorder can also be used for dictation and recording of conferences is a generally attractive one because it makes the one set of machines have many functions. Since the dictation process in particular is not efficient unless the dictation machine itself is at the elbow of the dictator, this makes the telephone recording instrument have the same general requirements of nearness to the dictator. While it appears at first blush to be attractive to some executives to locate the machine itself on the secretary's desk or at a remote point, yet in practice the fact that the executive wishes to dictate at moments when the secretary is not at hand, and that he is subject to frequent interruptions requiring playback before resuming dictation, makes this type of system complicated and impractical. In telephone recording equipment, the use conditions are similar since the executive may receive calls at moments when the secretary is not at her desk to conveniently change records or record them, plus the fact that they may be confidential calls that he wishes to keep for himself only. Another fact in the telephone recording situation is that the further the record of the conversation is from the man who made the record, the less confidential it is apt to be.

Photographed at recent Indiana convention (left to right), H. F. Scott of L. M. Berry Co., Don Sorenson of Telephone Engineer Publications, and John Berry of L. M. Berry Co.

A telephone recording system in business accomplishes three main purposes:

(1) It speeds business transactions.
(2) It assures accuracy of detail.
(3) It eases the tension of attempting to conduct important conversations while making pencilled notes of what is said and is a natural adjunct to the long distance telephone call.

Under the heading of speeding up business, there are many known cases in which recording of quotations, specifications, delivery dates, shipping instructions and other similar details obviates the necessity of waiting for mailed confirmations. For instance, one company reports that on several occasions they were able to prevent a day or two lay-off of all the employees in some of their factories. The fact that they did not have to wait for a confirming letter permitted them to start production at once.

Many companies hesitate to start a new order or to institute a change without a written confirmation. When a telephone recording is made, there is no need to wait for relatively slow mail.

As costs and competitive positions become of increasing importance, the ability to move quickly and at the same time be assured that the moves made are correct and safe, becomes of increasing importance.

One of the reasons, certainly, for this country's well known efficiency is the ability to work fast and avoid costly delays. The telephone recorder is simply another step in the direction of speed and efficiency and thus is important to our business welfare.

As to accuracy of detail, Ex-Governor Martin of Pennsylvania expressed the need of telephone recording in these words, "The modern trend toward the use of the telephone in placing orders, negotiating contracts, and furnishing specifications makes it desirable to employ some device to record such communications. The frailty of the human memory renders it imperative that some permanent record of important details be made.

Many misunderstandings arise through failure to remember all details which were discussed over the phone. This is particularly true when the call is a long distance.

When more than one employee is required to perform acts which were discussed during a call, each of the employees involved can hear the recording of the conversation. So often the tone of voice or the inflection used is important to a clear understanding. Being able to hear the conversation as it actually took place removes the possibility of error.

Moreover if quite a large number of people need to be acquainted with the facts, the recorded call can be transcribed and made available.

Again there are many cases on record showing that the accuracy obtained by telephone recording has prevented costly mistakes which had been common previous to the recorder's installation.

As to easing of tension, this is often spoken of by users of telephone recording equipment. The attempt to jot down notes or copies of telegrams while talking on the telephone has always been accepted as one of the natural ways of working. It is only when such tension is no longer necessary that its absence is appreciated.

The use of recording invariably therefore, tends to shorten the time of transmission per call but also greatly tends to increase the number of long distance calls. It represents another forward step in communications and should prove a long term source of added revenue to operating companies.—THE END.

TOLL CALLS

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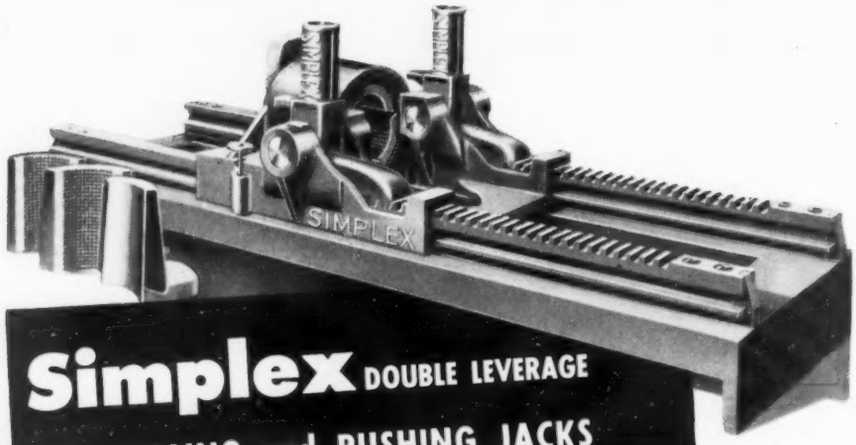

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ACCURATE . . . POWERFUL . . . ECONOMICAL . . .

The double levers and double racks make this the most powerful, accurate and economical Jack available for pushing pipe under paved streets, alleys, tracks, lawns, sidewalks, etc. Permits use of longer lengths of pipe — for substantial savings on cutting, threading and coupling costs. Can be used for lead pipe, duct, and culvert installations. Tapered steel jaws, which completely surround the pipe, prevent crushing or flattening.

Write for Bulletin No. U46.

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Count on KLEIN

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- Pliers and cutters
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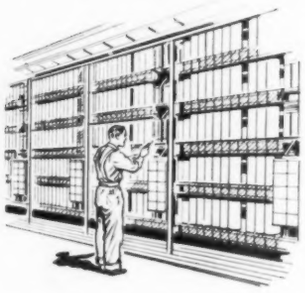
IN THE EXCHANGE



Klein Tools are work savers that aid your men to do better work . . . put jobs through faster . . . guard their safety. Easy on the budget, these quality tools cut down on tool expenses. The name "Klein" has stood for tops in quality and the finest in tools, ever since 1857. When you're buying new tools, be sure you get Klein.

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Wisconsin Holds Annual Meeting

(*Continued from page* 48)

relations committee to improve labor-management relations, advise members on applications of federal and state labor laws, consider and recommend to the association's directors desirable changes or additions to federal and state labor legislation, and review proposed labor legislation and submit recommendations to directors.

(2) Create a plant committee which would formulate desirable plant objectives for general improvement of telephone service through such items as development of additions, constructions, maintenance practices, etc.

(3) Formation of a rural telephone service committee to (1) develop and recommend policies and practices for uniform application which will expand and improve rural telephone service, (2) advance the program of establishing exchange area boundaries, and (3) review and advise members on pending legislation affecting telephone companies primarily rural in character.

Among Wisconsin conventioners were (in background) Leon Roberts, Roy W. Siemund and B. H. Piepmeir.

Mr. Dakin also recommended that consideration should be seriously given to increasing membership dues and stated that expansion of association activities would benefit all members. He stated that employment of full or part time personnel would aid in the accomplishment of badly needed objectives such as establishment of exchange area boundaries, traffic visits and training by an experienced supervisor, review of filed tariffs and advice to members on development and filing of adequate tariffs, holding district meetings throughout the state, and inspection and advice to smaller com-

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Research and experiment have produced in Hemingray insulators a glass insulator that is better than any ever before offered.

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Photographed at Wisconsin convention (left to right): Walter Dakin, W. C. Bolenius, president of Wisconsin Bell, G. B. Rogers, A. H. Bowden, Joe Byrne and Howard Bersted.

panies on proper maintenance and construction practices.

Mr. Dakin stated that mobile radio telephone service is "on the way to becoming widely used, mainly through promotion by the telephone industry."

"The chief competitors," he said, "to the telephone industry in the application of this service are the bus and taxicab companies who evidently intend to use private systems. . . ."

Mr. Dakin explained that the Wisconsin Telephone Company has completed the Green Bay highway installation and upon completion of the Milwaukee highway installation, the St. Louis - Chicago - Milwaukee - Green Bay highway system will be complete.

Leon Roberts, commercial and public relations representative, Telephone Services Inc., Chicago, opened the second general session on Wednesday afternoon with his discussion of "Easing the Strain on Public Relations." The second speaker, Ray W. Smith, editor of TELEPHONE ENGINEER Publications, discussed "The Small Company's Future."

Editor Smith stated that small "farmer lines" with indifferent leadership are one of the major problems facing Independent telephone companies today.

Mr. Smith advised association members to "work with the rural co-operatives and show them how to improve their service." He said the improperly organized "farm lines" with antiquated management and equipment were giving the rural telephone business a bad name and were partly responsible for Government regulations, actual and proposed.

The final program feature of the second general session was an open forum which resulted in discussion of many troublesome points of operation. G. A. Klein, general plant superintendent of the Community Telephone Company, Black River Falls, served as moderator. Other members of the forum panel were: R. C. Siegel, chief engineer of the Wisconsin Telephone Company, John Reding, traffic superintendent, Commonwealth Telephone Company, Madison, and T. J. Murphy, district manager of the Wisconsin Telephone Company.

The first speaker at the third general session on May 22 was Samuel Bryan, commissioner of the Wisconsin Public Service Commission, Madison. Mr. Bryan discussed "Essentials for Presentation of a Rate Case" and pointed out that a telephone public utility contemplating the problem of whether or not it should seek to increase rates should first determine that it actually has a rate case.

T. C. Thompson, telephone sales manager, Stromberg-Carlson Company, Rochester, N. Y., discussed "Today's Problems of the Manufacturer" at the Thursday morning session.

Mr. Thompson stated that he had talked with representatives of, not all, but most of the manufacturers who supply materials to the operating companies in the Independent telephone industry and found that while there are not many new problems in the strict sense of the word, "those with whom I talked were glad of the opportunity to have you know that; in spite of the fact that the war has been over for a long time, the manufacturer is not yet out of the woods."

"By and large," he said, "your manufacturer is confronted with the same difficulties that faced him in October of 1946 when, at the time of the national convention, a group of manufacturers told the convention the problems they were then having. In many instances, however, the problem has become aggravated because another seven months have passed by and the unfilled order pile of the manufacturer is not only larger but many of his customers have had to be told that delivery of the order which they have had on the books for a number of months is not yet 'just around the corner.'

"There are many reasons for this, some of which I shall touch on later, but I suggest that we all keep in mind that you, the operating company, and your manufacturer are trying to do a job together that is greater than any job the industry has ever been called upon to do."

Mr. Thompson stated that manufacturers are faced with a distinct problem when it comes to employing production design, circuit or equipment engineers or draftsmen familiar with the telephone business.

Manufacturers have found in many instances where they have placed orders with suppliers for metals of certain size or alloy, suppliers have, according to the shipping tags, sent exactly what was ordered. However, a check by the physical testing labs on receipt of the metals has revealed that an inferior grade or a substitution has been made by the supplier. Search for the proper metal then starts all over again. Production schedules are, therefore, set back and delivery promises made in good faith have to be changed.

"You can help your manufacturer," Mr. Thompson stated, "in several ways. First, make an honest effort to place your equipment orders with him as far in advance as possible, thus giving him time in which to properly process the order and, perhaps, even make allowance for disappointments in delivery schedule. In this emergency period, order standard equipment insofar as possible."

At the final convention session on Thursday, three popular industry speakers addressed the audience. T. F. Miller, connecting company representative, Wisconsin Telephone Company, Milwaukee, discussed "Telephone Views." W. C. Bolenius, president of Wisconsin Telephone Co., presented an interesting address on the subject "Selected." The final speaker was Francis X. Welch, managing editor Public Utilities Fortnightly, Washington, D. C.—**THE END.**

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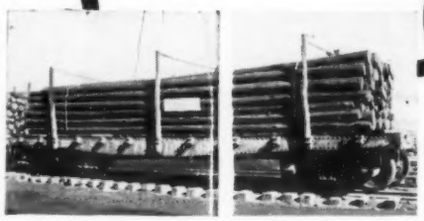

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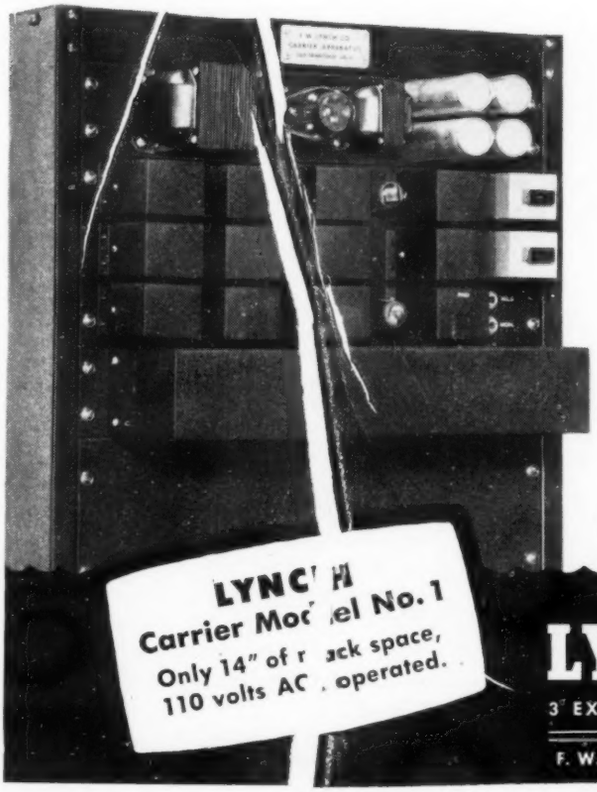

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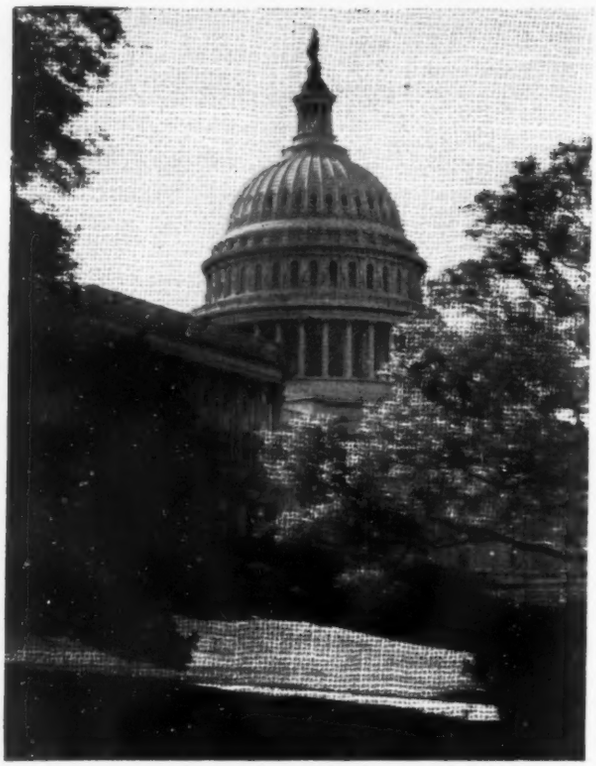

★ COURT and COMMISSION Activities ★

White Bill Would Split FCC Into Two Units

Legislation to reorganize the Federal Communications Commission and rewrite the F.C.C. Act was introduced in the Senate May 23 by Senator White (R., Me.), chairman of the Senate Commerce Committee.

The measure would divide the 7-man Commission into two divisions—the broadcast division which would have jurisdiction over radio, television and kindred communications, and the common carrier division which would regulate telephone, telegraph and other communications to a specific address.

Senator White proposed further to repeal present authority of the President to appoint the F.C.C. chairman. Instead, his bill provides for the election of a chairman by the Commission itself, thereby conforming with several other quasi-judicial agencies which select their own head.

Mr. White said he has not consulted the F.C.C. about his bill but "he assumed" the agency would oppose some of its provisions. He added that some of his proposals have been embodied in previous bills before Congress and were opposed by the F.C.C.

◆

Georgia Commission Imposes "Penalty Rates" on Independent

In order to improve telephone service of small Independents, the Georgia Commission recently took the drastic step of ordering two companies, Interstate Telephone Co. of Attapulgus and the Seminole Telephone Co. of Donalsonville and Jakin, to rehabilitate service and prescribed "penalty rates" reducing present rates by one-half until their plants are restored to serviceable condition.

◆

New York Commission Records 1946 Cut in Telephone Rates

The New York Public Service Commission in its annual report for 1946 cited that out of a total of utility rate reductions of $11,690,000, the Commission had cut telephone rates about $650,000 last year.

◆

Radio Telephone No Basis For Boosted Taxi Fares

The FCC has emphasized in a letter to the National Association of Railroad & Utilities Commissioners, whose members regulate taxicab rates in some areas, that present experimental taxi radiotelephone grants prohibit the operation of commercial communications service and that increased taxi fares for radiotelephone-equipped cabs are contrary to such grants.

The letter pointed out that "There are indications that taxi companies may seek authority to assess a service charge not previously made for calls at remote points, to increase existing service charges, or to obtain a general raise in fares on the basis of the cost of maintaining radio dispatching facilities. In one instance to which the Commission's attention has been directed, a public utility commission was urged to order an increase in fares, based in part upon the increased costs resulting from the installation of radio facilities. Irrespective of the Commission's restrictions on experimental service, the contention that radio costs are a basis for increased charges appears to be inconsistent with representations to this Commission by taxi-

WHAT THEY'RE SAYING...

E. H. B. Bartelink
Radio Engineer
General Telephone System
New York, N. Y.

"The public demand for mobile-radio service is unmistakable and equipment to provide it is available. If the telephone companies plan to give the public telephone service where it needs it and when it needs it, it seems clear that they should rise to meet this challenge. If they don't, others will. If any telephone company is considering, 'Should we go into mobile radio?' the answer definitely is 'The time is NOW'."

LINK THE WORLD'S RESOURCES . . .

IN THE HOLIDAY RESORTS . . .

The high tempo of modern business life demands that those who work must play. To amuse, house and cater for them others must work and thus a huge business is built up—the Holiday Industry—with one feature peculiarly its own. The activities of a holiday town are seasonal and the promenades, beaches and gardens, thronged at one period of the year, may be almost deserted at another. Upon the efficiency of telephone communications the earning capacity of the resort greatly depends. The service provided must therefore be economically capable of variation from intense activity to comparative inactivity.

Strowger Automatic Telephone Equipment possesses great flexibility in both operating characteristics and physical construction. Its design is such that only the minimum of equipment need be installed, yet even periods of heavy "peak" traffic can be handled without difficulty. Elimination of human operators ensures that there are no seasonal employment problems, nor high salary overheads to be carried when decreases occur in the call rate. Strowger Automatic Exchanges can be provided for any number of subscribers' lines and are capable of rapid extension as the need arises.

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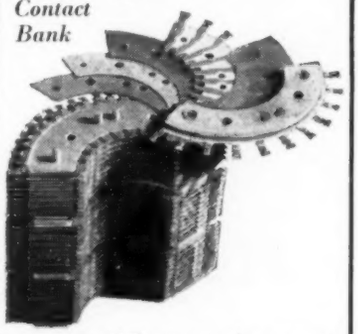
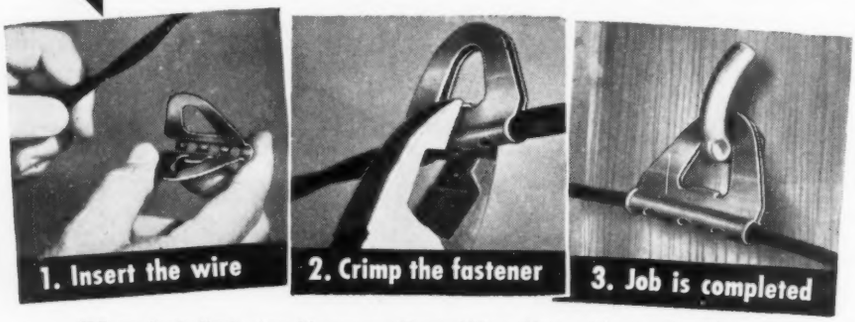


- *It is specially constructed to prevent difficulties arising through warping or expansion of material.*
- *It consists of ten double layers of contacts set radially, each layer having eleven separate and insulated contacts.*
- *The Bank contacts are arranged radially so that switch wipers need travel only a short distance between contacts.*
- *Each level of contacts is mounted in one fan-shaped piece to facilitate assembly and alignment, after which one shearing operation segregates the contacts.*
- *Phenol fibre insulators are used.*
- *Levels are screened each from the next by aluminium spacers bonded and connected to earth.*
- *Levels are arranged with only .015" allowance between them.*
- *Contacts are made of brass and have burnished wiper ends.*

Speed Up Drop Wire Installations with Kearney Drop Wire Clips

Installation is simple and fast — using only a pair of ordinary pliers.



When installed, the Kearney Drop Wire Clip will stay in place. The wire is completely enclosed so that it cannot fall from the clip. It avoids spot loading, too, because it grips the wire over the entire length of the clip.

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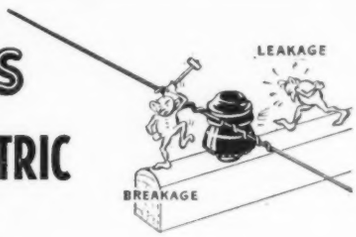

Stay on the Job!

Once installed, insulators from Automatic Electric "stay on the job" . . . fighting rain and sun, heat and cold. They're made by Hemingray or Whitall-Tatum—of clear, non-porous glass, carefully annealed for greater strength and long life. And they're carefully inspected for all possible flaws before shipment.

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cab operators that the allocation of radio frequencies would result in reduced operating costs by reason of the saving in non-revenue mileage."

◆

FCC Schedules Hearing On Mobile Telephone Service

The FCC has assigned a general hearing beginning September 8 to consider the mounting demand for mobile radio telephone service. In an announcement accompanying the order the commission referred to the demand for frequencies by common carriers, taxicabs, stores, doctors, etc., and to the need for information upon which to base future rules. As to telephone company use of frequencies the announcement said that the common carrier type of mobile radio-telephone service is expanding at a very rapid rate. Common carrier mobile service has been authorized in 58 cities and will be provided for the most part by the Bell System and Independent telephone companies. The telephone industry has authorizations for about 5,600 mobile units in the urban service. Its projected investment so far totals about $6,000,000. Thirty-seven licenses have been authorized to charge for this service.

◆

Knutson Proposes Freeze On Social Security Taxes

The freezing of Social Security taxes on employers and employees at 1% to prevent the automatic boost to 2½%, heretofore an annual occurrence and a serious problem to business because of the sharp boost in taxes involved, will be extended for two years if a proposal of House Ways and Means Committee Chairman Harold Knutson is accepted by Congress. Rep. Knutson, noting that the automatic increase, again slated for Jan. 1 unless Congress acts to extend it, would amount to $2 billion a year, said he would lay the recommendation for a two-year freeze before his House tax legislation-writing group.

◆

Rate Boost Approved For Rockland, Idaho

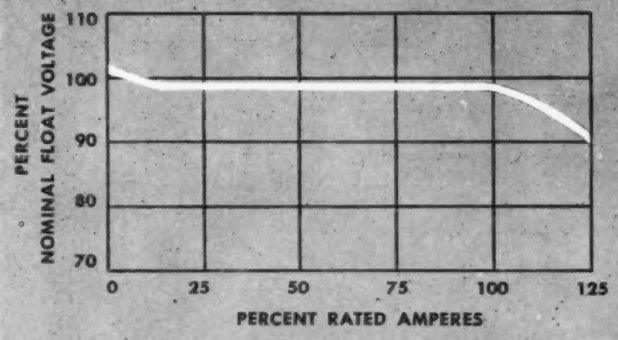
The Idaho Public Utilities Commission has approved application of the Rockland Telephone Company for increase in rates and charges.

Authorized rates are as follows:

	Present Rate	Approved Rate
Party Business	$3.50	$3.50
Residence	2.00	2.50

BATTERY-CHARGER FUNDAMENTALS—

how constant voltage increases battery life



Typical Voltage Regulation Curve of the E. P. Diverter-Pole Motor-Generator

Operating records of many exchanges show that the E. P. Diverter-Pole Battery Charger increases battery life from six to fourteen years. Its steady voltage eliminates the dangers of both *low* and *high* voltages. Batteries are maintained at their correct charge under a full floating system, to fully protect exchange requirements. High battery temperatures, excessive gassing, and undue breaking down of the active cell material are prevented to assure the longest possible battery life. Keeping a battery in a fully-charged condition at all times means that it is ready to furnish power at peak current demands beyond the capacity of the charger, and that it stands ready to provide emergency power in case of an interruption of the commercial power supply.

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Since 1923, Diverter-Pole Motor-Generators have proved to be the most reliable, maintenance-free and efficient source of direct current for Telephone Exchanges. The characteristics of E. P. Diverter-Poles are ideal not only for the most satisfactory floating charge (a full floating charge is now the accepted standard), but also for carrying the major portion of the exchange load better than any other source of direct current.

The main reason for this superiority is that The Electric Products Company is a specialty manufacturer. For every exchange battery-charging application, E. P. designs and builds an individual Motor-Generator that fits exactly the requirements of the particular operation.

The result is Proved Performance as evidenced by the unequalled long-life records established by Diverter-Poles throughout the Telephone Industry.

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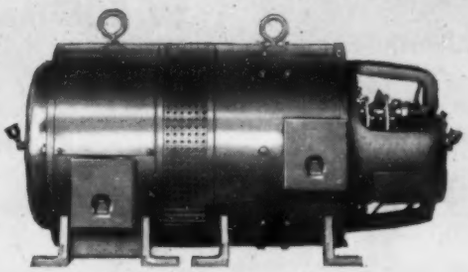

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- Are completely automatic
- Control exchange voltage well within high-low limits at all times
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- Are self-protecting against dangerous overloads
- Will not "run away" or reverse polarity

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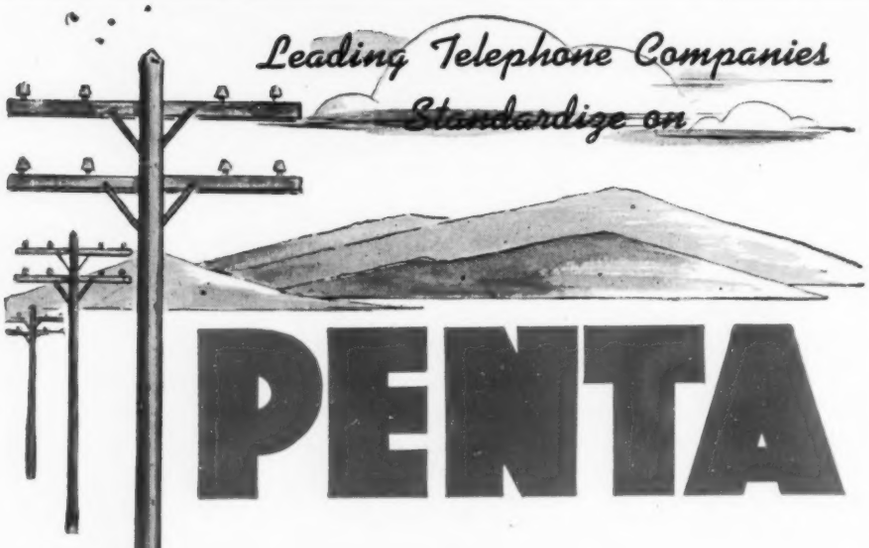

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"STILL IN THE LEAD"
Distributed by AUTOMATIC ELECTRIC SALES CORPORATION . . STROMBERG-CARLSON COMPANY

Automatic Electric Co. Names Ferguson Supply Sales Mgr.

George L. Ferguson, former buyer of the telephone construction materials and supplies for the purchasing department of Automatic Electric Company and its affiliates, has been appointed supply sales manager for Automatic Electric Sales Corporation, succeeding K. C. Gillette who recently resigned. Simultaneously, Carl W. Schwob, formerly of the company's Chicago sales office, has been appointed assistant supply sales manager. With

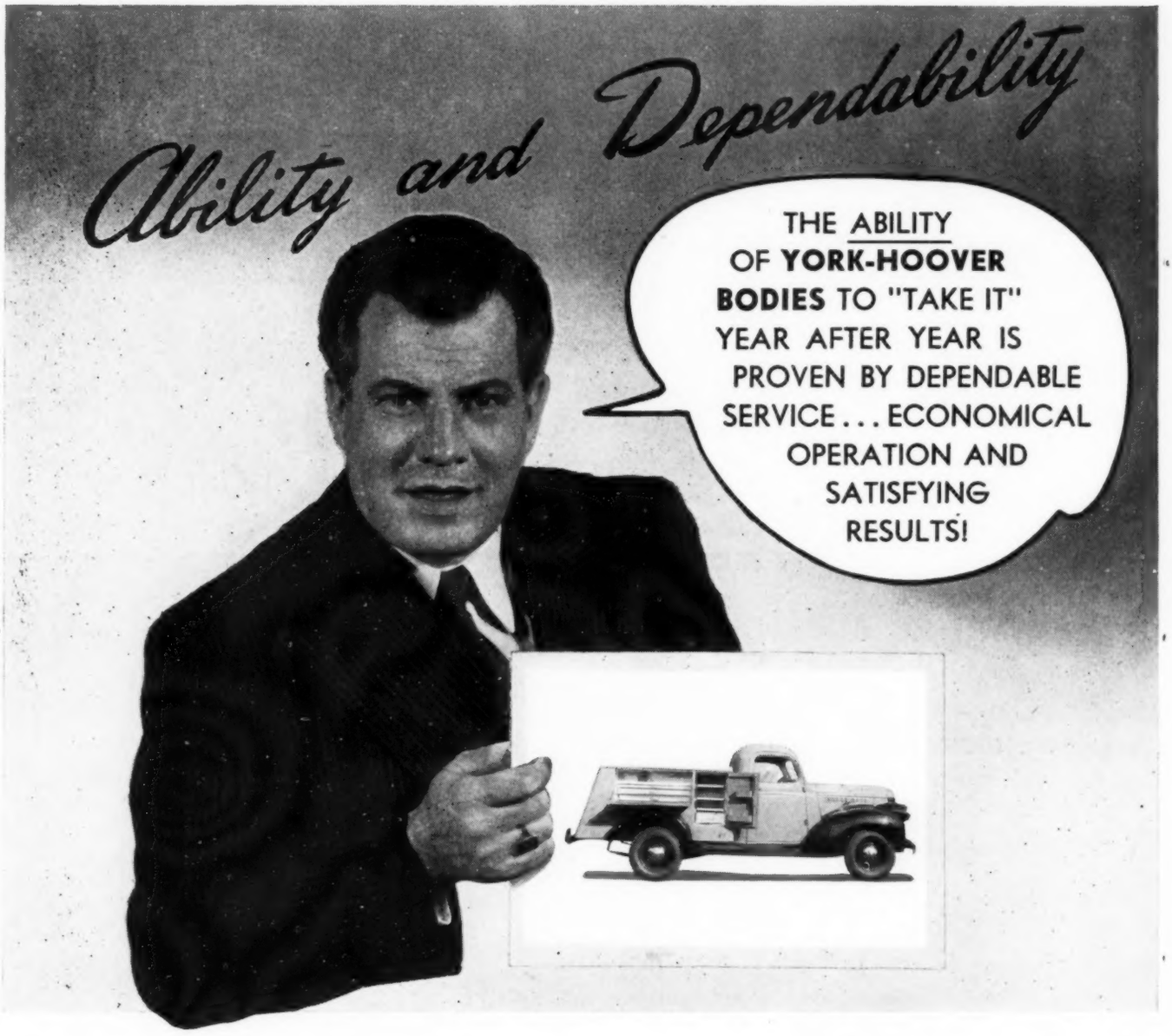
GEORGE L. FERGUSON

a background of experience in this field extending well over 30 years, Mr. Ferguson now assumes charge of all sales activities relating to materials, tools and supplies used in plant construction, maintenance and operation.

Mr. Ferguson's career in the telephone business dates back to 1912 when after leaving school he joined the Dean Electric Company of Elyria, Ohio, working first in the factory and then in the company's sales department. In 1915 he went to Rochester, N. Y., to join the Stromberg-Carlson organization. After a brief period at the company's home office, he served in the Kansas City sales office and then in Texas, and was occupied in the sale of supplies to Independent telephone companies in those areas until 1923.

An interlude of a few years in the radio field evidently did nothing to dampen his enthusiasm for the telephone business, for early in 1930 he returned to Chicago and joined the Automatic Electric Group, for which he has since continued in various sales and purchasing capacities in the telephone supply field.

Ability and Dependability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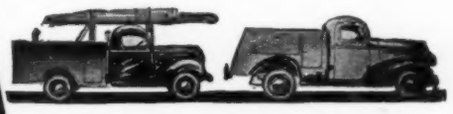
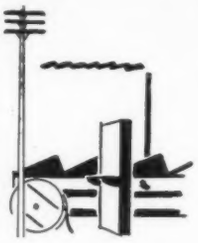


YORK, PENNSYLVANIA

Supplier's News Briefs



New Booklet Describes Hydrauger Equipment

A newly issued 16-page bulletin is available from Hydrauger Corporation Ltd., San Francisco, Calif. According to E. D. Rogers, manager of the concern, the time and labor saving advantages of these horizontal earth boring machines seems more valuable than at any previous time. The three new compressed-air operated models 10-A, L-2, and LHH-2 (a radical new, hand-held model) are fully covered in the new bulletin.

◆

Bruce O. Watkins Joins A. B. Chance Company

Bruce O. Watkins, formerly with the Bureau of Reclamation, Washington, D. C., has been appointed construction and maintenance equipment engineer for the A. B. Chance Company, Centralia, Mo.

A graduate of the University of Arizona, Mr. Watkins became an engineering member of the Technical

Bruce O. Watkins

Standard Division of the Rural Electrification Administration, Washington, D. C., in 1937. While with this organization he presented several papers on sectionalizing and protective practices on rural lines, and served on various standards committees in the R. E. A. and A. I. E. E. He also obtained operation-experience with R. E. A. projects in Michigan and Arizona. During the war, Mr. Watkins was a Navy lieutenant and saw duty in the Pacific.

◆

Kordless Kwikheat Soldering Tool

One of the latest aids for mechanical craftsmen is the Kordless Kwikheat soldering tool, manufactured by the Sound Equipment Corporation of California, Glendale, California.

Designed for intricate work, it is claimed this pencil-type, cordless soldering instrument is the ideal tool for tight spots and is extensively used for extremely delicate mechanical operations, such as in the assembly of small switches; electric meter work; instruments; for the hobbyist in making model mechanical devices; and for dental technicians.

The Kordless Kwikheat is placed in operation by simply screwing the Heater-Receptacle into any size Kwikheat electric soldering iron and "plugging-in". The Kordless forged tellurium copper alloy tip holds approximately 680° temperature for nearly one minute and reheats in approximately 20 seconds by "re-inserting" into the heater-receptacle, in a manner similar to using a desk pen-set. The heater-receptacle and the normal soldering tip are quickly interchangeable in the Kwikheat iron.

For exceedingly fine work, and without the annoyance of a cord fouling sensitive equipment, the manufacturer states the Kordless Kwikheat will speed the soldering work of technicians engaged in the production of intricate instruments.

◆

Federal Appoints Engsberg Chief Telephone Engineer

The appointment of Ralph W. Engsberg as chief telephone engineer of Federal Telephone & Radio Corporation, manufacturing associate of International Telephone & Telegraph Corporation, Clifton, New Jersey, has been announced by E. N. Wendell, vice president in charge of Federal.

Ralph W. Engsberg

Mr. Engsburg, who has been associated with telephony for more than 30 years, joined Federal's telephone engineering department in 1945. Prior to that he was with Automatic Electric Sales Corporation, Automatic Electric Company and Western Electric. During the first World War, Mr. Engsberg served in France for 18 months as a lieutenant in the Air Service.

While with Federal's telephone Engineering department, Mr. Engsberg assisted in preparation of a five-year plan for the expansion of step-by-step equipment in the Havana area of the Cuban Telephone Company, another I. T. & T. associate. Soon after that he was appointed assistant chief telephone engineer.

Born in Lake Mills, Wisconsin, Mr. Engsberg received his degree in electrical engineering from the University of Wisconsin. He is a member of Etta Kappa Nu, honorary electrical fraternity, the Independent Telephone Pioneers and the Telephone Pioneers of America. Mr. Engsberg currently resides in Nutley, New Jersey.

Hugh A. Triplett Joins A. B. Chance Co.

Hugh A. Triplett, formerly chief engineer of Schweitzer & Conrad, Inc., Chicago, has joined the engineering staff of the A. B. Chance Company, Centralia, Mo., where he will be in charge of engineering the company's line of power switching equipment.

Hugh A. Triplett

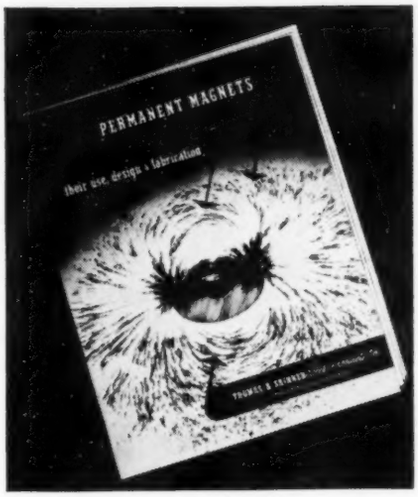
Mr. Triplett, after receiving his degree from the Milwaukee School of Engineering, gained his early engineering experience with the H. O. Doherty Company of New York, and the Duquesne Light & Power Company, Pittsburgh, Pa. He joined Schweitzer & Conrad in 1925 as electrical engineer and was appointed chief engineer in 1937. He holds more than 40 patents in the field of power fuses and power switching equipment, many of which are responsible for some of the major advances in the protection of transmission and distribution systems.

◆

New Bulletin Describes Permanent Magnets

A complete bulletin on the "Use, Design and Fabrication of Permanent Magnets" has been released by Thomas & Skinner Steel Products Company, Indianapolis, Indiana.

The bulletin discusses advantages and limitations of permanent magnets in many present and potential applications, plus technical information and data on all known magnet materials and basic design formulae. The bulletin is primarily a magnet engineering treatise and was prepared by engineers of the Thomas & Skinner concern which has specialized in the design and fabrication of permanent magnets for more than 46 years—the longest period of service in the permanent magnet industry.



The bulletin is available without charge on request to Thomas & Skinner Steel Products Company, 1092 East 23rd Street, Indianapolis, Indiana.

◆

Galvin Mfg. Changes Name To "Motorola, Inc."

At a recent stockholders meeting the corporate name of the Galvin Manufacturing Corporation, makers of Motorola home and car radios and Motorola car heaters, was officially changed to Motorola Inc. This change of name will also be made on the stock listing of the New York Stock Exchange as well as in the articles of incorporation of the company. The articles were properly amended in accordance with the Business Corporation Act of the State of Illinois.

◆

Albert F. Lang Joins Automatic Electric Co.

Automatic Electric Company has announced that Albert F. Lang, Air Vice Marshal, Royal Air Force, (Retired), has joined the staff of that company as Director of Technical Liaison. In this capacity, Marshal Lang will establish and maintain contact on technical matters with communication equipment manufacturing companies and operating organizations in various countries abroad, including both Gary Group affiliates and others.

Marshal Lang's long and brilliant career in the military air service of the United Kingdom and the British Commonwealth began in 1912 with his association with the Royal Flying Corps (forerunner of the R. A. F.) and has

(*Please turn to page* 81)

ACORN INSULATED WIRE

TODAY TELEPHONE WIRE has to be tough

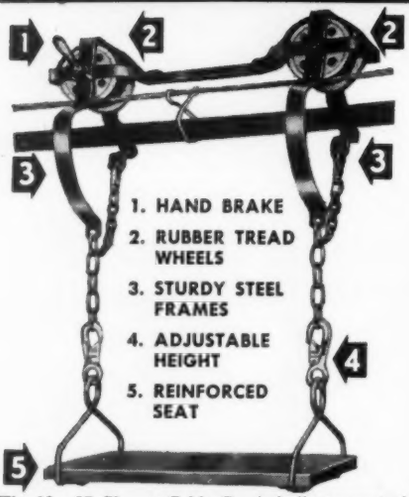
Many years of specialization in the manufacture of communication wire has built a performance record for Acorn Drop Wire.

ACORN'S exclusive Carton package preserves carefully developed QUALITY until installed . . .

ACORN INSULATED WIRE COMPANY, INC.
225 King Street, Brooklyn, N. Y.
LEICH SALES CORP., 427 W. Randolph St., Chicago
LINDSAY SUPPLY CO., 4815 Superior Ave., Cleveland

Drop Wire—Bridle—Interior—Tree—Ground—Switchboard—Pothead—Cable Terminal—Instrument—Fixture—Buried Wire

CHANCE CABLE CARS
Make the Job Safer and Easier



The No. 27 Chance Cable Car is built to meet the most exacting specifications for safety and performance. The hand brake stops the car and holds it anywhere on the messenger. Lightweight Aluminum rubber cored wheels ride smoothly over hundreds of thousands of rings without appreciable wear. Sturdily constructed steel frame and reinforced seat will last a lifetime—seat is easily detached and adjustable in height for comfort and convenience.

Chance Cable Cars were used by the Armed Forces. They are built to give you the same exceptional service. For more information, write today.

A·B·CHANCE CO. · CENTRALIA MISSOURI

ALL the strength and durability inherent in steel are combined---with definite economies---in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

Modern Testing Instruments

(*Continued from page 35*)

and viewing alternating current wave forms, as a frequency measuring device, and for various other purposes. Essentially it consists of an evacuated tube in the end of which is a fluorescent screen. Electrons emitted from a heater-cathode are focused in the form of a pencil beam and propelled through the tube by means of accelerating elements carrying high positive voltages. The beam of electrons passes through deflecting plates and impinge on the fluorescent screen causing a greenish glow at the point of impact. Controls permit the beam to be sharply focused to produce a tiny round spot at the point the beam strikes the screen.

The voltages to be analyzed or measured are connected to the deflecting plates and will repel or attract the beam of electrons thereby moving the spot across the screen in a direction determined by the relative polarity on the two deflecting plates. When the voltage applied to one set of plates (no voltage on the other set) is alternating in character the beam will move back and forth across the screen forming a straight line.

Two sets of plates (some tubes use magnetic coil deflection) are generally provided. One plate acts on the beam horizontally, the other vertically. By placing a *sweep voltage* on the horizontal plates the beam is caused to move back and forth forming a straight line pattern across the face of the tube. If the voltage under measurement is connected to the vertical plates this will cause the beam to move in a vertical direction.

Fig. 26—Popular cathode ray oscillograph useful for telephone testing (Photography Courtesy of Allen D. Dumont Laboratories, Inc.)

TO BE CONTINUED

Continue with Part V of Mr. Burden's article on "Modern Testing Instruments" in the July 15 issue of TELEPHONE ENGINEER and MANAGEMENT.

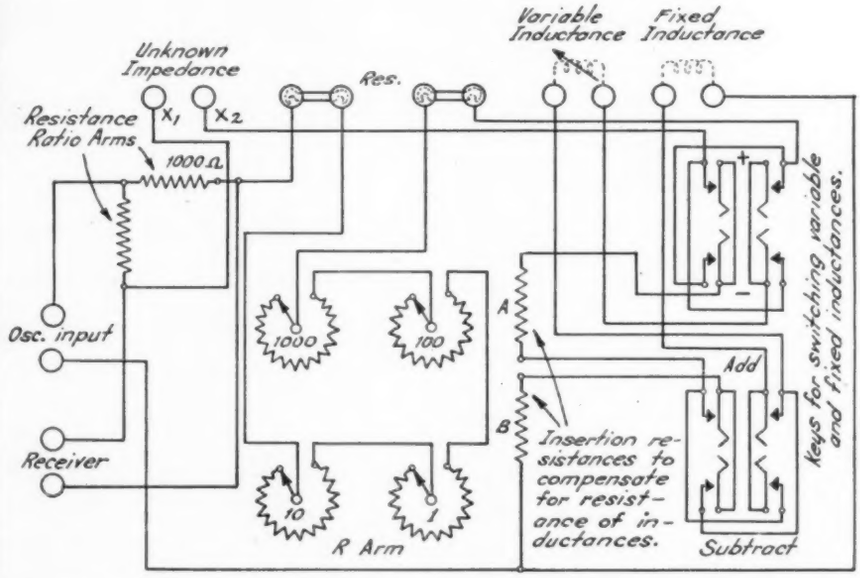
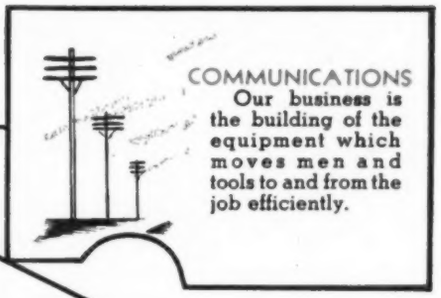


Fig. 25—Circuit of the Impedance bridge commonly used in telephone work.

American

SERVES THE SERVICE COMPANIES



COMMUNICATIONS
Our business is the building of the equipment which moves men and tools to and from the job efficiently.

GAS
Into American bodies, we incorporate utility, comfort, convenience, safety and appearance to give you the lowest cost per mile of operation.

TELEPHONE
Standard parts and assemblies on American bodies facilitate production and permit easy maintenance.

WATER
Our policy — design and build the type bodies you need to maintain good service at lowest cost.

ELECTRIC
Here are some of American's better known models — DPL (line construction; B-4 (crew compartment); 4460 (service) and 4804 (service compartments).

This company is the largest exclusive manufacturer of utility truck bodies for the utility industries. American makes bodies for Line Service, General Service, Meter Installation, Utility, Crew Compartment, Maintenance and Street Lighting . . . also a complete line of aerial equipment for street lighting, maintenance and other overhead work.

THE American COACH and BODY COMPANY

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TELEPHONE and TELEGRAPH EQUIPMENT

COSTING OVER TWO MILLION DOLLARS!

AT AKRON, OHIO, there are huge inventories of telephone and telegraph equipment. These inventories include wire and cable, telephones, switchboards, carrier equipment, repeater equipment, tools, test sets, and many other miscellaneous telephone items.

■ The War Assets Administration offers this entire lot of government owned surplus at fixed prices concurrently to all priority claimants and commercial purchasers. Twenty per cent (20%) is reserved to fill the needs of Federal Agencies on orders received by July 7, 1947. All other orders received by this date will be filled in the following sequence: (1) Veterans of World War II, (2) Federal Works Agency (buying under Public Law 697), (3) Subsequent priority groups, and (4) Commercial purchasers.

■ Veterans should apply at their nearest WAA Certifying Office for certifications. The Veteran's "offer-to-purchase" *must* contain the date, case number, and the location of the Certifying Office.

■ All sales are subject to the Standard Terms and Conditions of Sale of the War Assets Administration. The right is reserved, of course, to accept or reject any or all orders.

■ This equipment is completely catalogued in Listing WAL-C9-79, dated June 16, 1947. Visit or write any WAA Regional Office for a copy. It explains in detail the location and condition of this equipment (used or unused), how to inspect, and the Standard Terms and Conditions of Sale. This listing also contains official forms which must be used for the submission of all orders. All orders should be sent to War Assets Administration, Cleveland Regional Office, Aircraft and Electronics Division, 1265 Euclid Ave., Cleveland 1, Ohio.

Remember . . .
get your copy of Listing WAL-C9-79 first!

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WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

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1233

Suppliers News Briefs

(Continued from page 77)

MARSHAL LANG

continued through both world wars and the intervening peacetime years. Especially noteworthy have been his contributions to the development of communication and signal methods, the organization and administration of communication services for the R. A. F., and his devotion to the many phases of collaboration in communication matters which helped bring victory to the United Nations.

Marshal Lang will make his headquarters in Chicago, and for the next several months will be engaged in familiarizing himself more completely with the company's products and their markets in the international field, and with the scope of operations of the company's affiliated manufacturing, sales and engineering organizations in various parts of the world. Thereafter, it is expected that he will make periodic visits abroad for the purpose of discussing liaison matters with the company's customers and with other manufacturing organizations in the communications field.

◆

"Penta" Preservative Is Remedy for Future Headaches

Looking much like ordinary wood, "Penta" Preservative treated lumber is a unique modern building material. Impregnated with pentachlor-

(Please turn to page 84)

And With Bashlin's, Men Think of the Job.

EQUIPMENT Safety is taken for granted with Bashlin's Original Rolled Edge Belts, Bantam Weight Climbers, Safety Straps, and other linemen's equipment. Why?

Experienced linemen know that for dependable service and safety equipment of the highest quality, Bashlin's is unequalled.

Write for

NEW 3 COLOR CATALOG ILLUSTRATING COMLETE LINE OF BASHLIN SAFETY EQUIPMENT

W. M. Bashlin Co.
GROVE CITY 1, PA.

The Clearing House

For the Convenience of readers of Telephone Engineer

Chemical Dehydrators

Automatically controlled, using flake calcium chloride for preventing dampness and condensation in a tomato totally enclosed telephone exchanges.

The H. J. Kaufman Co.
13215 Roselawn Ave., Detroit 4, Mich.

One-man SALLY SAW portable
Gasoline motor. Fells and cuts up. Wghs. 63 lbs. Free Folder
Your farm implement dealer or write—
Dept. T. 9 Melcher St.
CUMMINGS MACHINE WORKS
Boston 10, Mass.

THE RATES for this department are as follows: 10c a word, cash with order, please. Box number service if desired. We Run Ads for Veterans Free of Charge. For display advertisements ask for rate card. Address all correspondence to: TELEPHONE ENGINEER PUBLISHING CORPORATION, 7720 Sheridan Road, Chicago 26, Illinois.

A NEW, IMPROVED—

UNIQUE SPLICERS FURNACE

Melts 50 Lbs. of Solder in 10 Minutes

Basically the same fine furnace used by larger Utilities for 20 years - Now with

- **FINE FLAME CONTROL**—keeps solder at "just the right temperature."
- **"QUICK CHANGE" GENERATOR**—removed and replaced in 60 seconds.
- **WIND-PROOF**—housing shields generator—No extra shield is needed.

Additional Features: Long-life figure "8" generator—with orifice scraper. Rugged semi steel top plate. Powerful pump. 16 gauge welded steel tank with bottom shock ring Size 8" x 13". Weight—15 lbs. Popular size for 6", 7", and 8" pots.

No. 55-I—KEROSENE No. 53-I—GASOLINE
If clear white gasoline is hard to get, order the Kerosene Furnace. You'll like it.

We Invite An Approval Test

UNIQUE MANUFACTURING CO., INC
221 W. Walton St., Chicago 10, Ill.

CLASSIFIED ADS

Help Wanted

WANTED: Lineman, Troubleman, married man, who's wife is an operator preferred. $40. for 40 hours and very nice heated flat included. Exchange located in Western N.Y. State. Box 8495 c/o Telephone Engineer and Management.

HELP WANTED: First class Cable Splicer for construction and maintenance work. Write giving age, experience and reference. Peninsular Telephone Company, Tampa, Florida.

HELP WANTED: Man to service small Automatic and common battery exchanges also capable of doing ordinary electric house wiring and repair work. Permanent job. Good wages. Box No. 8501.

HELP WANTED: We need a traffic man. Large Independent Company. Middle West. Statewide operation. Automatic and manual exchanges. Good salary. Box No. 8502.

WANTED: Combination man, for inside and outside work. Must be familiar with dial equipment. Write or phone E. G. Stephenson, Mgr., Consolidated Tel. Co., Florence, Kentucky.

DO YOU NEED "KNOW HOW" for a better job . . . do you want to catch up on developments in telephony today? For the answers to questions in general and your problems in particular, we recommend highly the books listed in this issue of TELEPHONE ENGINEER & MANAGEMENT.

Position Wanted

VETERAN of World War I and II. Age 49. 17 yrs. experience inside and outside plant. 9 yrs. experience as Plant Wire Chief. Experienced on W. E., S-C, Kellogg, Leich and Strowger Automatic equipment. Prefer supervisory job on either inside or outside plant or telephone supply warehouse. Highest references and training. Write Box 8487, c/o Telephone Engineer.

Position Wanted: Plant Superintendent or Field Engineer. Veteran, 5 years experience with Class "A" Telephone Company as Field Engineer. Commissioned in Signal Corps and served 1½ years with Heavy Construction Battalion as Construction Officer. Balance of service was performed as Communications Officer in Air Corps. Location anywhere in United States. Married, Age 27. Address Box No. 8496.

For Sale

FOR SALE: One 200-line magneto switchboard, American Electric make, two position. One Cook Main Frame 200 pair switchboard, 300 pair table side. 40 telephones, 5 bar, 1600 Ohm, wall style. 58 telephones, 3 bar, 1000 Ohm, wall style. 82 telephones, 3 bar, Bell Boxes. 80 Desk Stands, Western Electric and Kellogg. 12 Hand Sets. 2 Pay station telephones. Please send in your bid F.O.B. to Blanchard Telephone Company, Blanchard, Oklahoma.

FOR SALE: Nickel Plated Automatic Electric Desk Stands with No. 23 Dials. Lima Telephone & Telegraph Company, 122 S. Elizabeth Street, Lima, Ohio.

Reconditioned Kellogg No. 2000 Type Relays

Spring Combinations

2002	2007	2023	2037	2064
2003	2019	2027	2043	2077
2004	2020	2029	2046	2089
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Coils

SB	SAD	SEK	TJ	CZ	CDM
SC	SAH	SEM	TX	CAA	CDP
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SF	SAQ	SFU	TAV	CAJ	CEA
SH	SBG	SGF	TAY	CBE	CEB
SJ	SBH	SGH	TBL	CBM	CEC
SL	SBX	SGJ	TBN	CBY	CEQ
SN	SDE	TB	TBQ	CCC	
SP	SDF	TC	TBU	CCD	
SU	SDG	TE	CB	CCG	
SW	SDT	TF	CU	CCN	
SAC	SEB	TG	CY	CCV	

Many other codes in smaller quantities. Complete relay assemblies, mountings and covers.

BUCKEYE TELEPHONE & SUPPLY COMPANY

COLUMBUS 6, OHIO

Wanted To Buy

WANTED TO BUY: Exchange which can be bought with down payment of approximately $6,000. Condition not of prime importance as buyer is qualified telephone man. Would consider investment in business with employment. West of Mississippi. Wife is experienced in traffic and commercial. Veteran. Box No. 8500.

For Sale

FOR SALE: New No. 444A Western Electric Cord Tip Press Tools for use in repairing Switchboard Cords by the solderless cord tip method. $10.00 each f.o.b. Los Angeles. Supply limited. Write Jewell-Summer Co., 435 S. La Cienega Blvd., Los Angeles 36, Calif.

IMMEDIATE DELIVERY: Lamp and Lamp Cap Extractor tools. 1 each WT 101 and WT 102 Tools. $2.50 Set. Quantity discounts given. Wilcox Electric Company, Inc., Telephone Division. 14th & Chestnut, Kansas City, Missouri.

Wanted To Buy!

We will pay a SUBSTANTIAL PRICE for—

A Reliable Electric No. 101 Protector Banks, 20 pair with flat wood fuses or round fibre fuses with flat end pieces.

Telephone Repair & Supply Co.

Daniel H. McNulty, Manager

Rogers Park Station Chicago

finishing cloths

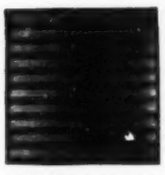
packed in cartons

CABLE-SPLICERS WIPING CLOTHS

Wipe Perfect Joints

on lead-sheathed cable splices

catch cloths



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Northern White and Western Red Cedar Poles—Plain or Butt-Treated

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Use AMCON AMERICAN TELEPHONE and TELEGRAPH CONDENSERS

Specification sheets on request

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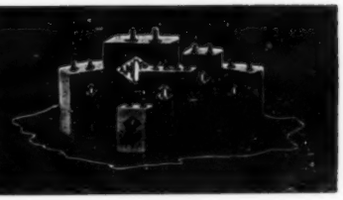
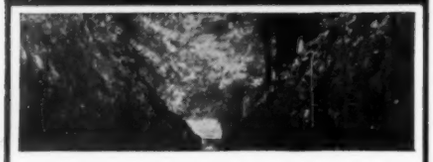
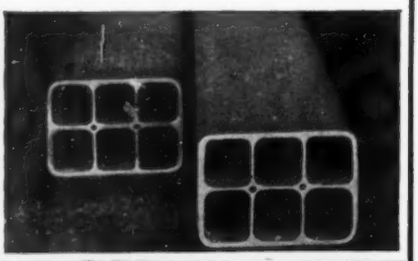


SINCE 1889
NATCO
CLAY CONDUIT



The proved and standard Protection for Underground Telephone Cables.

Cheapest in the long run. Highest quality and a full line of shapes.



National Fireproofing Corp.
202 E. Ohio Street, N. S.
PITTSBURGH, PA.

phenol, the wood is practically odorless, is clean to handle and takes paint perfectly. Yet it is safe from destruction by termites, beetles or decay.

Best news of all, to lumber users, is that "Penta" Preservative protection is there to stay. Pentachlorphenol is virtually insoluable in water, hence does not leach out. Any lumber treating plant may obtain "Penta" Preservative from branches of the distributor, the Chapman Chemical Company, 333 North Michigan Avenue, Chicago 1, Illinois.

◆

Interesting Bulletin Prepared By Chapman Chemical Co.

Timely information on the habits and elimination of wood-destroying insects is contained in a new folder on "Penta" Preservative entitled "Chemical Control Methods for Termites and Lyctus Beetles."

The folder tells how these pests operate and presents evidence to show the effectiveness of "Penta" Preservative, (5% pentachlorphenol in petroleum solvent.) Copies of bulletin 46-T may be had on request to the Chapman Chemical Company, 333 North Michigan Avenue, Chicago 1, Ill.

U. S. Rubber Expands Wire Production Facilities

Expansion of wire production facilities in the Bristol, R. I. plant of United States Rubber Company was announced today by Kemp Haythorne, new products manager of the company's wire and cable department.

The expansion involves purchase of more than a million dollars worth of rubber and plastic insulating equipment from the government and other sources. The additional facilities are expected to increase the plant's capacity to three times its prewar output.

The bulk of the new machinery is designed for insulating wire by the company's patented Laytex dipping process produces lightweight wire with smaller diameters and perfectly-centered conductors, resulting in superior electrical properties.

In announcing the expansion program, Mr. Haythorne predicted a continuing heavy demand for electrical wire. He expects many new applications, including industrial heating, plating, annealing and vulcanizing by electrical methods. He also foresees increased extension of electricity into rural homes.

He said the copper shortage which had been hampering production is now being solved by the use of aluminum conductors in wire. This new wire has emerged from the experimental stages to win wide acceptance in the electrical industry. It compares favorably with copper in quality and can be produced at lower cost.

◆

J. H. Watkins, Sales Veteran, Retires From Automatic

After more than 20 years as a sales and service representative for Automatic Electric, J. H. Watkins, of Chillicothe, Ohio, retired from the Company's employ on March 31, 1947.

Jim Watkins started his career in telephony in 1908, as a central switchboard operator. During the next 18 years, he gathered a great deal of experience in telephone operating, manufacturing and sales activities.

On August 1, 1926, he joined the staff of the sales department of Automatic Electric Company and was assigned to the territory including southern Ohio, northern Kentucky and the northwestern section of West Virginia.

OLIVER
TELEPHONE LINE
BRACKETS
FROM THE COMPLETE LINE OF OLIVER POLE LINE MATERIALS

You will find all types and sizes of brackets required for telephone work in the complete Oliver line. Some of the popular styles are illustrated. Various types suit the practices and requirements of leading telephone, telegraph and railroad companies. For full details see Catalog 43.

OLIVER
IRON AND STEEL
CORPORATION
South Tenth and Muriel Streets • Pittsburgh 3, Pa.

MAKERS OF POLE LINE MATERIALS SINCE 1894

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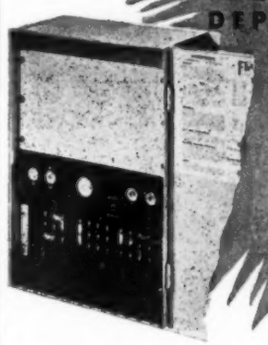

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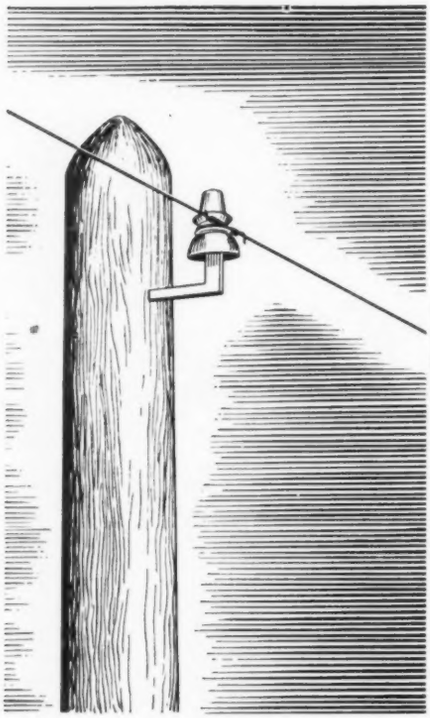

★ 1847 ★

Glass knob on iron spike

ALTHOUGH glass was known to be an excellent insulator, knob type insulators were not satisfactory in wet weather. Changes in shape were tried, with a groove to support the line. To attach to the pole, glass knobs were cemented on an iron spike.

Hemingray has developed fast, economical production methods for today's insulators—with designs to meet all pole line requirements.

Write for the complete historical outline of insulator development.

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Owens-Illinois Glass Company
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THE BACK OF THE BOOK

By JOHN G. REYNOLDS
Managing Editor

"TIDE" CHAMPIONS BELL ADS . . .

NOT LONG after the A. T. & T. ran those ads about Alexander Graham Bell being born 100 years ago, NEW YORKER magazine took issue, urging that "this genial monopoly cut out the hoopla, and get down to the business of installing telephones."

In its editorial columns "Tide" said: "We disagree. This attitude may be fine for people interested only in receiving more telephone calls, but we think the problem goes much deeper than that.

"After all, any advertising man—even a Tabu or Munsingwear or Garnier Liqueurs man—could see that the telephone company had to do something to:

"(1) Create a market for its product among those thousands of Americans who have forgotten about it during the shortage or who, deprived of phone service, have devised other satisfactory means of communication—e.g., smoke signals, semaphores, shouting, carrier pigeons, etc.

"(2) Offset the horrible misunderstanding, viciously spread by that Ameche and his Hollywood chums, about just who did invent the device.

"(3) Remind children that this instrument is not a fancy postwar gadget that will come down in price once production gets rolling.

"Yessiree, we're glad the company did it. We were becoming vague about its products ourselves. Same thing happened to us during the last war with the stereopticon."

• • •

IF YOU HAD $1,000,000,000

IS IT POSSIBLE to have too great prosperity? Obviously!

Delos Walker, Chicago economist, recently put the idea in this fashion:

"One million dollars, in good American currency given today to every American would immediately halt all business in this country, for doubtless millions would stop working. We would soon begin to freeze and starve. Money would have no buying power because no wealth would be created.

"We still have to milk 'bossy' twice a day, Sunday and holidays, rain or shine, whether rich or poor, if we want milk. Laws, strikes, dollars, high wages or desire won't get milk from the cow; only milking her regularly twice a day will do so."

That is worth a little thought. Too frequently we hear people complaining about the high cost of living while at the same time following and advocating policies which assure further increases in that cost.

• • •

WINTER STORY . . .

FILE this story from Alberta, Canada, away for next winter when the blast of winter hits you as you open the door, all bundled up for work, and you decide to call the boss and report off "sick."

A water tower had overflowed and the water, blown into spray by the wind, fell on the power and telephone lines coating them with ice that measured four inches across in many places. The following day, with a nice, cool breeze blowing, three power lines and a street lighting wire broke under the weight of the ice and the swinging caused by the wind. What happened?—you know as well as I.

Up the poles, down the poles, climbed the linemen. Cold winds froze their cheeks and noses, particles of ice went down their necks. Yet they spliced wires and restored service. They started at 4 A.M. and climbed down with frozen hands and feet at 6:10 A.M.!

Today, with spring coming in on all fronts, the "woolies" going in the moth balls, the garden tools coming out, and the old cuss words at cut worms springing up, a winter story is "cold stuff", but winter will come again and linemen will again be out "freezing up solid" to bring service to those who want it.

Compare the fast, easy *Nicopress* Line Splice with older methods . . . just do this

1 CLEAN ENDS OF WIRE

2 INSERT WIRE IN SLEEVE

3 COMPRESS WITH THE EASY TO HANDLE *Nicopress* TOOL

and you get this

The completed splice is stronger than the rated breaking strength of the wire itself.

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